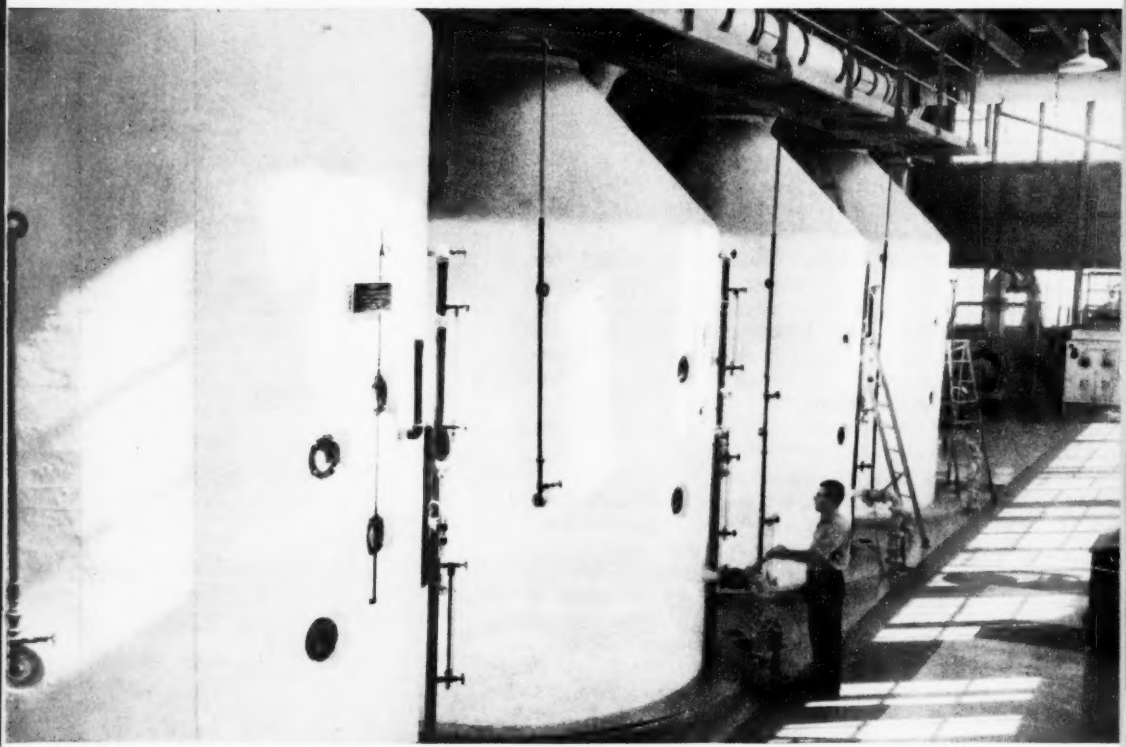
FEBRUARY, 1951

Food Industries

For those who control quality and costs through management and production—a McGraw-Hill publication



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Food Industries

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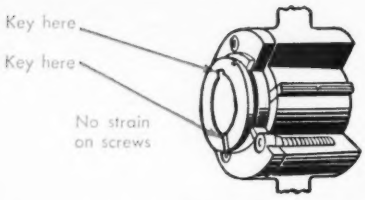

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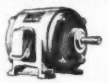

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HIGHLIGHTS

Present federal laws are not adequate to deal with use of chemicals in foods, Delaney Committee says in a preliminary report. It is recognized, however, that unnecessary obstacles to technological improvement in food processing and production must not be created. (News)

It is dangerous economically to assume that demand for canned fruits and vegetables will increase as rapidly during the stepped-up emergency as it did from 1940 to 1945, NCA president, Henry J. Taylor, tells canners. Pack during war years jumped 50 percent above 1936–1940, but held at 36 percent above prewar during postwar years. So room for expansion is much less than it was 10 years ago. (News)

Meat industry representatives tell wage-price stabilizers that meat prices cannot be stabilized by rationing, which leads only to wasteful black market operations. They offered 3-point program: 1. Increase supplies of meat available for purchase. 2. Keep disposable income levels down. 3. Keep supplies of alternative goods and services up. Meat production, they said, can be increased 25 to 30 percent in next three to five years if the industry is left free of unworkable controls.

By printing shipping cases as they are used, food processors can simplify container inventory problems, save time, labor, and floor space. New case printer is designed to put legends on four side panels and the top of container as it comes in on the casing line. (Pg. 117)

Salted nuts and peanut butter remain fresh up to twice as long when a minute quantity of a new antioxidant—BHA (butylated hydroxyanisole)—is added to the frying oils and salt. Shelf life is extended even further when BHA is synergized with propyl gallate and citric acid. (Pg. 81)

Controlled humidity, as well as temperature, in rail shipments are now possible in reefers equipped with a new two-unit mechanical refrigeration system. Recently developed humidity device will eliminate top and body icing, slime, mold, wilting, and dehydration during shipment of such items as lettuce, strawberries, and other perishables. (New Equipment)

Consumer-size packages for frozen whole eggs, or separate whites, are being tested at Ohio State U. Under scrutiny are small-size metal cans, freezer jars, and souffle cups. Project is aimed at expanding markets for frozen egg products. (Pg. 80)

Borden's brings work on concentrated milk to pilot plant stage after more than two years research. Initial runs indicate need for further research on flavor retention. (News)

Higher sugar quotas are being requested by individual confectioners and bakers—indicating confidence in increased demand for these products during coming year. Confectioners are asking 9.97 percent more sugar than they used in 1950. Bakers want 15 percent more.

English biscuits, in a radically different package, are being introduced in U. S. to compete with our moderately-priced lines. New container consists of a grease-proof fluted parchment paper next to the cookies, moisture-proof waxed paper, and a fiber-paper outer wrap. Usual cardboard closure is eliminated. (New Packages and Products)

Yes...we want to sell Screw Conveyors...

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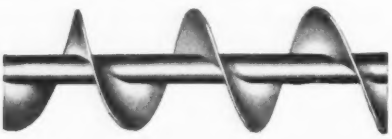

HELICOID OR SECTIONAL CONVEYOR SCREWS — for general screw conveyor applications. Can also be furnished in stainless steel; or other alloys for corrosion resistance, heat resistance; or for other special, unusual conditions.

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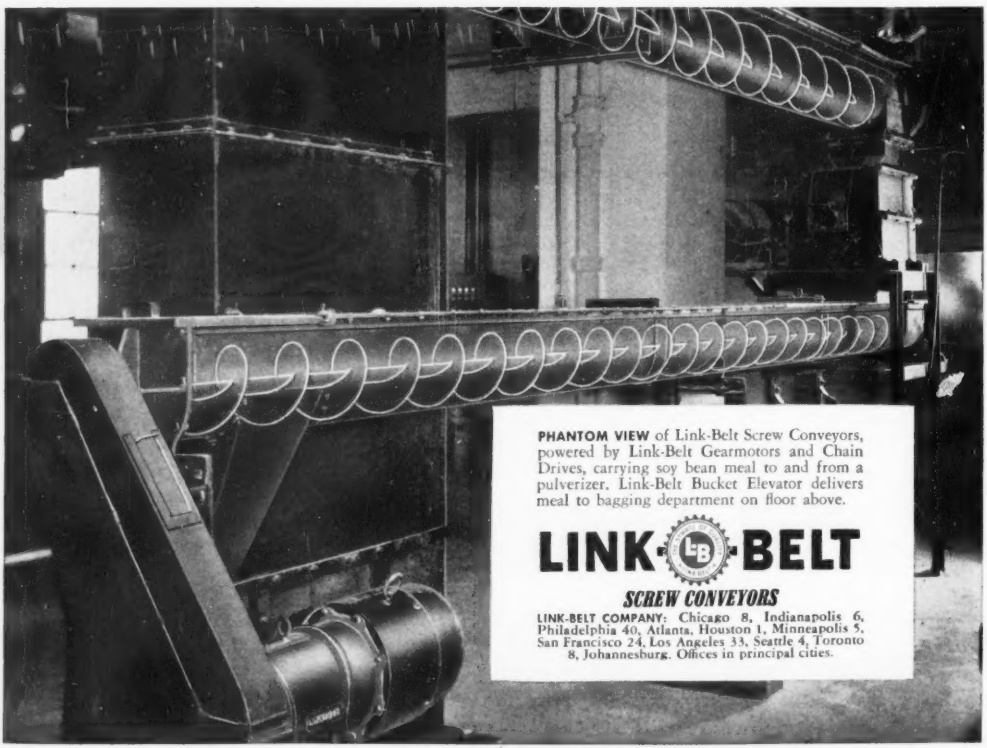

PHANTOM VIEW of Link-Belt Screw Conveyors, powered by Link-Belt Gearmotors and Chain Drives, carrying soy bean meal to and from a pulverizer. Link-Belt Bucket Elevator delivers meal to bagging department on floor above.

LINK-BELT

SCREW CONVEYORS

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The Talk of the Industry

Package Must Be Super Salesman

Nearly 83 percent of the purchases in a modern supermarket are based to some degree on buying decisions made in the store by the shopper, du Pont studies reveal. And the housewife makes a product or brand decision in a matter of seconds.

This puts terrific emphasis on effective packaging of processed foods. An attractive container in a mass display will get attention. Then it is up to the printed matter on the package to create further interest, and convince the shopper that the product is worth the price.

But a food product is not really sold unless it measures up to expectations when eaten. So quality remains the No. 1 requirement.

No Anti-Infection Food

Significant observations on the relation between nutrition and resistance to infection were made at the Delaney hearing on chemicals in foods by Dr. Howard A. Schneider, of the Rockefeller Institute for Medical Research. While it came as a surprise and a source of disappointment, the concensus among medical research men is that there is no special food or food factor, including vitamins, which you can buy at the store and eat to increase your resistance to infectious diseases.

While Dr. Schneider and his associates have found that some factor in wheat germ helps mice to resist *Salmonella typhimurium*, or mouse typhoid, the level at which such resistance factors occur in foods is a very low one. Therefore, these factors will have to be isolated and made available in concentrated form to be effective. And there probably will be a different factor for each biological group of infectious diseases.

So a well-balanced diet of ordinary foods remains the best health insurance.

Public Gets the Big Dividends

Who gets the greatest benefit from capital investments? Let's take a case in point: In the past fiscal year, John Morrell & Co. paid dividends of 50c. a share to stockholders. But it paid out in taxes an amount equal to $2.91 a share. Obviously, this efficient meat company is working for the public much more than for investors.

Hits Nail on Head—Twice

After pointing out that bakers have improved bread quality, Gerard D. Williams made two classical observations at the Congressional hearing on chemicals in foods. Speaking in behalf of American Bakers Association, he commented that "much confusion has been generated over the use of chemicals by bakers, and the motives of some of those raising the issue have been something less than altruistic."

And in opposing legislation which would have the effect of foreclosing scientific development by industry, Mr. Williams said: "Experience has shown that in their application, as time goes on, laws are too frequently extended far beyond the original intent or design of the Congress which passed them."

Any restrictions on the use of chemicals in foods should be made with these two points in mind.

Smart Equipment Evaluation

After extensive tests, Minute Maid finds advantages in two types of citrus juice extractors. One is a rubber-cup machine. The other is an extractor which pushes a tube into the fruit and squeezes it between metal fingers. The latter is made in rotary and in-line models, but the in-line requires less maintenance by virtue of eliminating cam wear. Another packer also considers this model easier to clean.

In buying food plant equipment, amount of maintenance and clean-up labor always should be a major consideration.

Have You Registered Yet?

As previously announced in FOOD INDUSTRIES, food technologists will be listed in the new National Scientific Register, an important mobilization tool. If you are a food technologist but are not on the IFT membership list, you should send your name and address to C. S. Lawrence, Executive Secretary, Institute of Food Technologists, 176 W. Adams St., Chicago 3, Ill.

Technical know-how is the backbone of defense. To use it effectively, the government must know who has it.

Hors d'Oeuvres

■Butter supporters must be slowing down. In the Michigan election, oleo votes in one precinct were tabulated for a gubernatorial candidate. But did you hear anything about misrepresentation or mislabeling? If you did, it didn't come from the butter people.

■MIT has completed a deep freezer "that will hold its contents at —452 deg.," says a Boston daily. Fahrenheit, we presume.

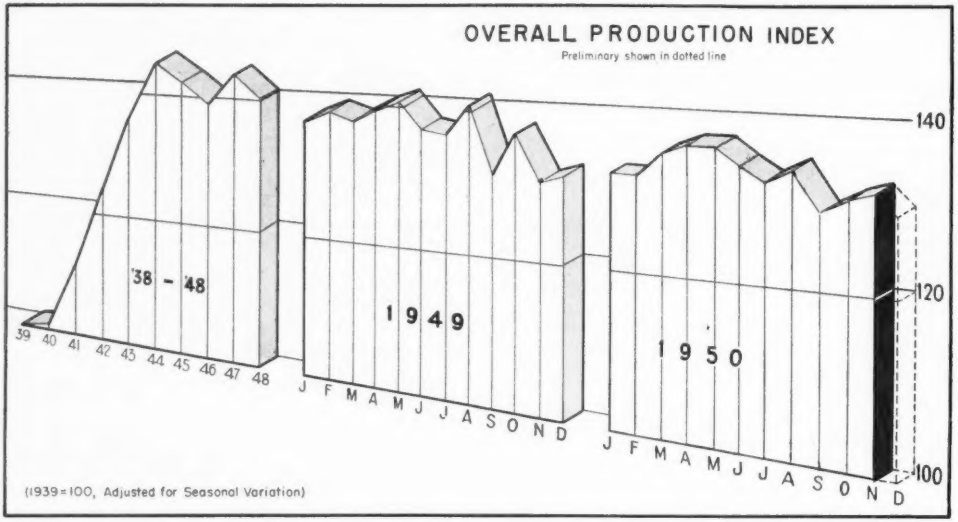
■ Among the 14,000 ways in which salt is used, seasoning of foods ranks third. Not a bad rating, but we might as well face it—there's room for improvement.

■ Quaker Oats is getting into the cat food business through purchase of Coast Fishing Co., Wilmington, Calif. They already have a dog food line and, of course, oat meal. A little bird seed now and QO is set up for the family business.

■ After tasting both kinds, a self proclaimed teetotaling judge recently decreed that boysenberry wine could not be labeled as blackberry. "In the common language of the people," she said—for indeed it was a she—"boysenberries and blackberries are different kinds of fruit." The wine had to be tasted to find this out?

■ Chicken sausage and chicken loaf are among the products to be introduced at the fact finding conference of the Institute of American Poultry Industries, this month. This could be a solid test if commercialism's pretty head can be kept under the table. J.A.J.J.

FI Index and Outlook


OVERALL PRODUCTION INDEX
Preliminary shown in dotted line
140
120
100
'38 - '48
39 40 41 42 43 44 45 46 47 48
1949
J F M A M J J A S O N D
1950
J F M A M J J A S O N D
(1939=100, Adjusted for Seasonal Variation)

Processed Food Supplies Tightening —Dairy Products in Particular

With demand outstripping production, food prices again become a major factor in national defense plans

MANUFACTURED foods dropped to the 130 point in our preliminary estimate for December, while November's final figure held at 133. The index thus reflects the upward trend of prices and the tightening supply picture.

The production picture has significance today chiefly as a background for the controversy over prices. It is generally agreed that keeping retail food prices down is the most important objective of any anti-inflation program. But there is no agreement on how to do it. World War II ceilings did not really work. And ceilings take away the strongest incentive for farmer and processor to increase output.

On the other hand, prices cannot be allowed to run away. One possibility is to have ceilings, but allow prompt relief whenever costs go up and output is hindered. Another answer—and the only one in the long run—is to increase food production by more efficient use of our soil resources, animal herds, farm equipment and processing capacity.

What are chances for a quick rise in food production easing the pressure under food prices? Clearly, chances are poor. As FOOD INDUSTRIES has repeatedly stressed, output in the first part of 1951 will be limited by the short supply of raw materials from the 1950 crops. Moreover, inventories of processed foods are being rapidly drawn down. Here is how supplies shape up in the various food fields:

Meats: First quarter slaughterings will not be much above last year. Hogs coming to market now were farrowed last spring. And there is only a small increase in numbers. There are plenty of cattle on feed, but a great many are young steers that will not be ready for market until next fall.

Heavy slaughter last fall raised meat inventories well above earlier levels. But this means little, with demand rising even faster.

Canned Goods: Some trade observers think vegetable canners will be out of inventory within the next month. And it seems sure that anything left will be scooped up by the military. Fruit canners are reported to have either shipped or committed almost all their 1950 pack.

Relatively large supplies of most canned foods are still on hand in the wholesale market. But dealers will be scrambling to get these.

Fats and Oils: There will be more lard next fall, along with more meat. But not much increase before then. And vegetable oil crushings will be lower than a year ago. Short 1950 crops of cottonseed and peanuts more than offset a bigger supply of soybeans. So total vegetable oil production in the year to October, 1951, is estimated down 3 percent from 1950.

Makers of shortening and salad

At a Glance—

(1939 = 100, with all figures adjusted for seasonal variation.)

	Nov. 1950	Oct. 1950	Percent Change	Year Ago
Baking	125	124	+1	126
Butter	73	69	+6	87
Canning	166	155	+7	155
Cheese	162	158	+3	168
Confectionery	125	133	−6	120
Evap. Milk	150	149	+1	104
Flour	102	103	−1	112
Ice Cream	195	190	+3	187
Malt Liquors	147	140	+5	145
Margarine	346	253	+37	268
Meat	146	149	−2	142
Sugar	91	91	..	97

dressings have been bidding up prices of all the vegetable oils. Cottonseed oil is selling for twice what it did a year ago. And stocks are down from 15,000 tanks to 10,000 tanks.

Sugar: This is one bright spot. The Department of Agriculture estimates that housewives and industrial users now hold comfortable inventories. And larger offshore supplies will be available for import during 1951. USDA has deliberately set import quotas high enough to permit further inventory accumulation. This is a hedge against overseas supplies being cut off by war.

Dairy Products: Once-enormous inventories are now melting away. Government has sold almost all its butter hoard, will hold onto what's left. Some of this butter is still in private stocks, of course. Total stocks of butter and cheese are still far above last year. But withdrawals from storage are running triple a year ago. At this rate, inventories will barely tide the market over until the spring milk flush.

This disappearing inventory represents many months' accumulation of milk production in excess of consumption. Once gone, these storage supplies cannot be replaced unless consumption dips or output hits a new peak. And just the opposite is happening.

Fluid milk deliveries are rising all over the country, as higher incomes make people willing to pay for it. Evaporated milk production is also up —above the previous year in November. But production of milk on the farm has been running slightly below last year.

Dairy Slump Coming

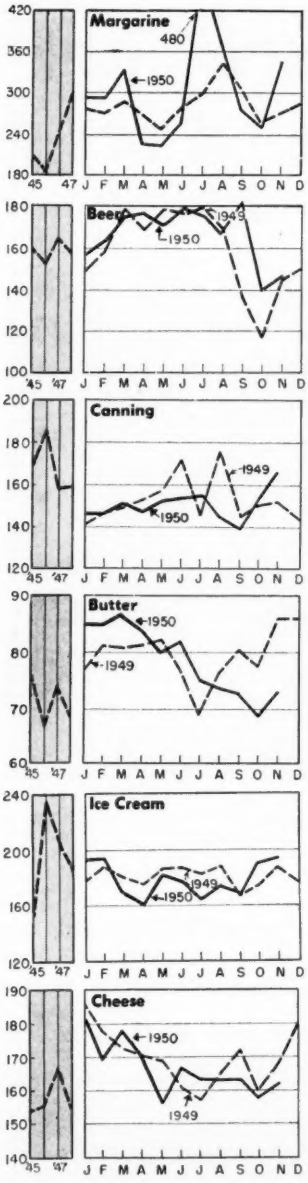
Worse yet, all signs point to a real nosedive in the flow of milk from farms. In Wisconsin, the nation's biggest milk pail, processors are already expecting a decline in their supply of fresh milk. Dairy farmers are losing their help to defense plants. And they are worried by high cost of feed and machinery. Fancy beef prices tempt them to sell off their herds and go into hay and cash crops. These take less work and offer as much or more profit.

There is talk about higher milk prices (or subsidies) to encourage dairy farming. But this will not help the men who make butter, cheese or evaporated milk. Any rise in the price of manufacturing milk is reflected in higher prices for fresh home-delivered milk. And if the farmer does stay in milk production, he's likely to make the shift to grade A to get the highest possible price.

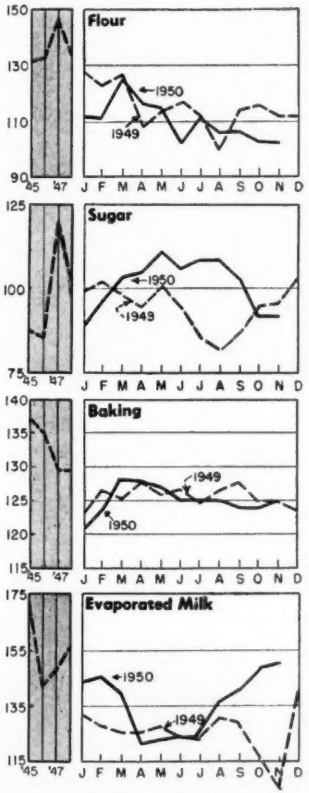
Watch for a change in the regional pattern of dairy production: Less in the Midwest, more in the Southeast. Most milk cows sold by Wisconsin farmers are going to other parts of the country. Southeastern farmers are the big buyers. This leaves out Wisconsin processors, boosts the South's growing dairy industry.

Margarine output has fluctuated wildly, particularly since repeal of the discriminatory U. S. tax on colored oleo. Production in 1951 is likely to be limited by the available supplies of cottonseed and soybean oils.

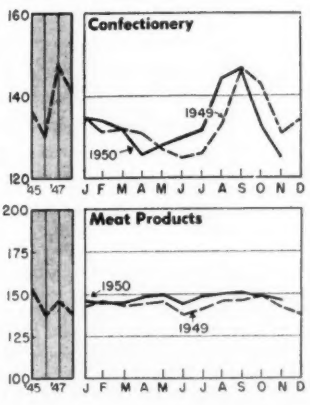
RISING ▲



STEADY →



FALLING ▼



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Gives you a premium product to sell at ordinary prices

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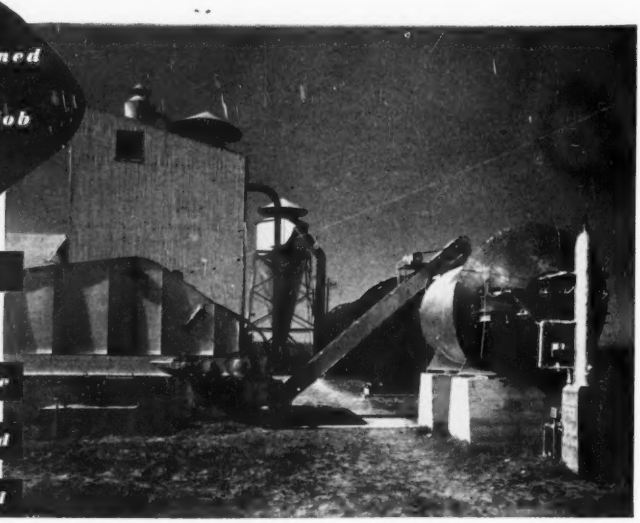

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White potato meal • Beet pulp,
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Offices in all principal cities

What Washington Thinks

NEW AEROSOLS—The use of allethrin in aerosol bombs has been authorized after careful investigation by the Department of Agriculture. This authorization is based on extensive experimental work in which the toxicity to man and animals has been carefully investigated, particularly the toxicity of the synthetic material in very fine state of subdivision in insect sprays. The new type of bomb can be used in all places where natural pyrethrins are applicable. This means that insect sprays containing synthetic material are permissible for food plant usage —subject, of course, to the requirement that the food itself not be exposed to the spray or spray residues.

MORE TIME—Poultry plant operators have been authorized by the Secretary of Agriculture to take somewhat more time to secure new facilities for compliance with the more rigid definition of sanitary plant equipment. The new ruling extends the final date for compliance with the new rules from January 1 to May 1. By that later date, even "New York dressed" poultry must meet the same rigid rules as previously imposed in Federal poultry inspection of eviscerated and packaged poultry.

NEW FROZEN MILK—The Bureau of Dairy Industry has devised a new method for making frozen concentrated milk, whereby it can be kept for some time and can later be thawed and reconstituted for use like fresh whole milk. The new product is "prepared by heating the milk at a relatively high temperature (155 deg. F. for 30 min., or 170 deg. for 1 min.), homogenizing it at 2,500 lb. pressure, concentrating it to one-third its volume, cooling, sealing in containers, and freezing." So prepared, the milk is said to keep well for several weeks if refrigerated at −10 deg. F.

FOR DAIRY RESEARCH—Recommended to the Bureau of Dairy Industry by the advisory committee, which serves under the Research & Marketing Act, are two phases of fundamental investigation of wide importance. The Committee urges the Department to. "(1) Find more efficient use of the non-fat portion of milk as human food or as components of food; and (2) intensify work on the disposal of dairy wastes." Numerous other recommended investigations range from improvement of cattle breeding and disease prevention through to the ultimate study of marketing methods and costs of distribution. These other recommendations are, however, not within the field of processing technology or products development.

"DO" ABUSES—The authority now granted to industry to rate orders for construction materials and equipment under the "DO" rating system extends in many cases to food plant facilities. But it is very important that such DO Orders not be placed except for specific projects in which the product made with the new facilities is definitely an emergency requirement of the military departments. Naturally some abuses have been noted by Washington. If recent warnings are not observed, a sharp crack-down is promised, and certainly is probable in a few extreme cases of abuse.

CLOSURE TROUBLES—Closure for all sorts of containers is being investigated by every smart food executive. Already recognized are scarcities of cans and even greater scarcity of tin for cap or can coating. Plastic alternates are not yet regulated, but will be. Closure gaskets will require careful planning, too, since the most convenient type of rubber will be far from abundant, perhaps unavailable for the "less essential" foods.

RE SURPLUS POLICY—Commodity Credit Corp. makes a great point of a provision in the Agricultural Act of 1949 which requires that CCC "shall not sell any basic agricultural commodity or storable nonbasic commodity at less than 5 percent above the current support price for such commodity, plus reasonable carrying charges." This explains why so-called "surplus" goods owned by the government are not turned loose to correct scarcities until prices seem wholly out of hand. The political implications of this at the market basket are not enough to persuade Congress to give less than this protection to the farmer, even in a war period.

SMALL BUSINESS—Many government procurement needs can be met directly only by very large-scale contracts. It is expected, however, that prime contractors will utilize as fully as possible the assistance of small business concerns by sub-contracting. Many food industry firms facing cutbacks because of raw material shortage are offered the assistance of both military and civilian departments in finding the place where they can help in the war effort. It is expected that small companies, or companies with limited facilities of a specialized type, will make their availability known either to the small business division of the Department of Commerce or to the appropriate military agency. Such applicants will then be referred to appropriate major contractors so that they may negotiate directly.

PRICE CEILING—In its first decision day of this year, the Supreme Court forbade certain distillers to continue fixing maximum prices for their beverages at the retail level. This in effect was called an attempt to establish "a private OPA without the adequate safeguards that government provides." Thus another price right of industry seems to have been abolished.

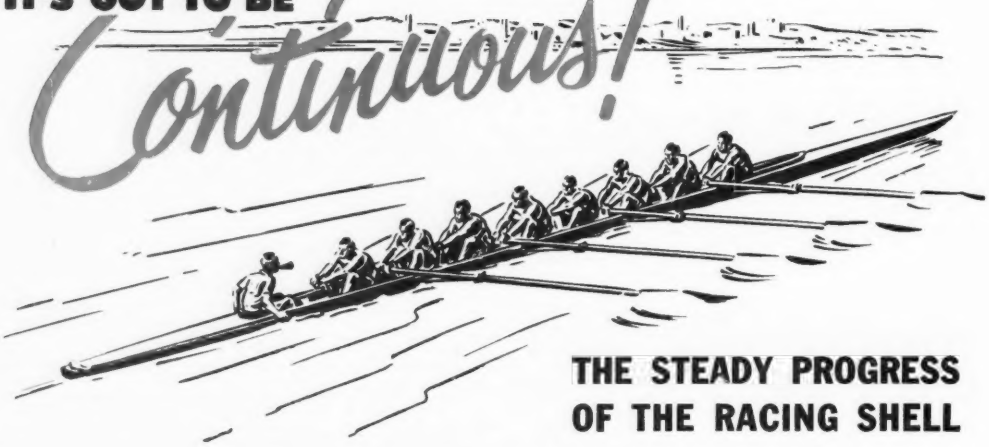
PREVENTIVE MAINTENANCE—Washington is tightening up on everything made of metal or containing other scarce components. This means that every food plant must take certain measures in preventive maintenance. Otherwise breakdowns or small delays may mean shutdowns on a whole line. Smart plant operators will recall the worst of their experience of 1942-45 and expect repetition.

MORE SOCIAL SECURITY—Effective with the beginning of this year are new regulations regarding Social Security taxes on additional groups of employees. Now included are employees in handling or processing of agricultural commodities. This may extend to certain food plants a wider requirement for Social Security deductions and remittances than previously applicable.

"RELUCTANT" DECISION—Egg prices will not be supported this year. When announcing this decision, Secretary of Agriculture Brannan said, "I am taking this action reluctantly." The reluctance was nominally because of the importance of egg income to many farmers. But certainly not negligible was the bureaucratic urge to retain authority over the market with attendant political leverage.

—R. S. McBride, Washington, D. C.

IT'S GOT TO BE *Continuous!*



THE STEADY PROGRESS OF THE RACING SHELL

Processing, too, must be continuous if it is to be truly economical and fast. De Laval machines make most effective use of centrifugal force to speed up production by getting rid of unnecessary interruptions. Where once hours were required for settling or other inefficient methods of separation or clarification, now the same work can be performed in a few minutes or even seconds by De Laval centrifugals.

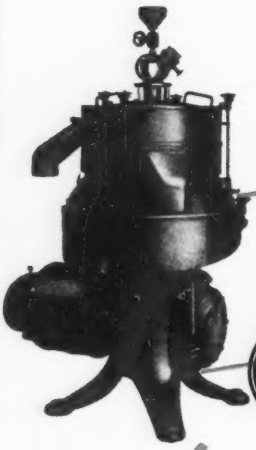
There are many different types and sizes of De Laval machines, each designed for a specific service under one of the three basic classes of service:

(1) the continuous separation of two liquids

(2) the continuous clarification of one or two liquids

(3) the continuous separation of two liquids plus the continuous removal of solids from one or both

Which of these would speed up ***your*** process?



Why De Laval?

De Laval has over 70 years experience in solving problems of separation and clarification. Your problem may be quite similar to one that has already been solved by De Laval centrifugals. It will pay you to ask.

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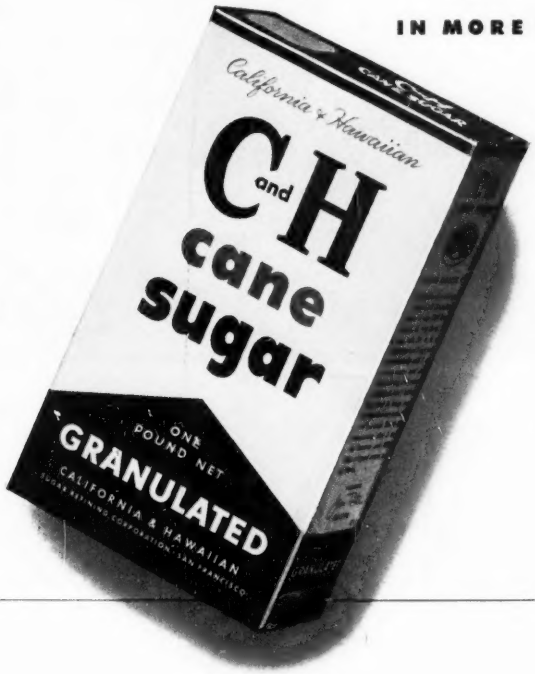
CONTINUOUS
SEPARATION AND CLARIFICATION WITH CENTRIFUGALS

It's a sweet package—

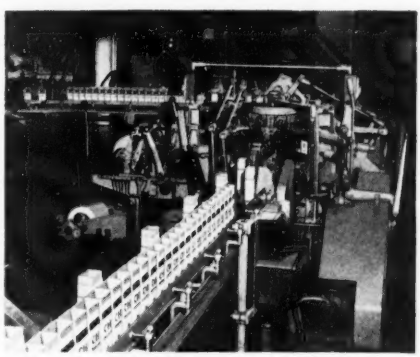
IN MORE WAYS THAN ONE!



YES, a sweet package — and we don't mean only the contents. That's tops, as every one knows — a product of the California and Hawaiian Sugar Refining Corporation, Ltd., one of the West Coast's greatest, most highly regarded enterprises. We're talking about the way C & H protects its fine quality from refinery to table — while keeping packaging costs down to rock bottom.

They do it — as so many other leading producers of packaged goods do — with Pneumatic machines. They use Pneumatic's famed double package maker to produce a package within a package — for double protection. They fill and seal their container with Pneumatic equipment, too. They wouldn't do it any other way, for the best of reasons — their experience has proved that Pneumatic machines operate more smoothly and more efficiently.

Mr. George W. Aljian, Director of Purchasing and Packaging, California and Hawaiian Sugar Refining Corp., Ltd., states: "One cannot overlook the fact that any progress along packaging lines has been possible only with the cooperation of outstanding and progressive organizations such as Pneumatic Scale Corporation. No one marketer of packaged products can expect to successfully advance without the assistance of those suppliers who devote time, effort and techniques to assist the customer to produce the strongest and best looking package at a minimum of cost."



Above: Installation of Pneumatic packaging machinery at C & H's plant in Crockett, California.

★ ★ ★

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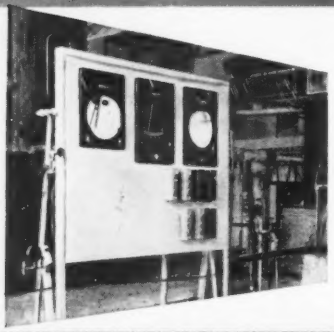

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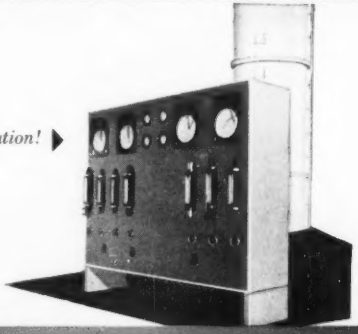

FROM COAST TO COAST!

OF INSTRUMENTATION

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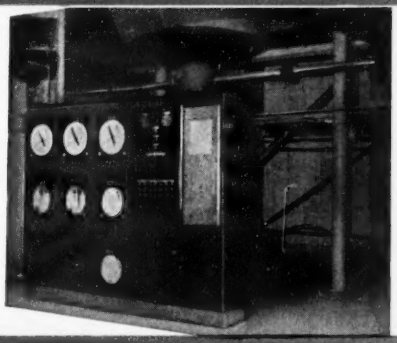
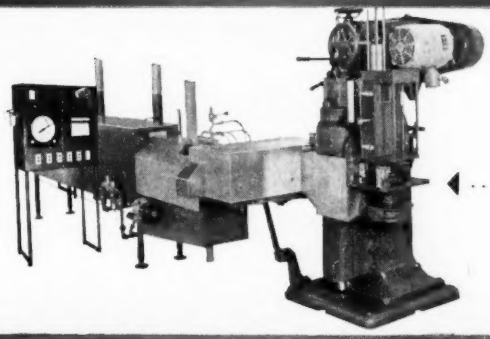


CONTROL TECHNOLOGY



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THE FOOD INDUSTRY

A LOT of changes are being made in food plant engineering . . . and a lot of quality conscious processors are turning to Brown Control Technology as a basic tool for the further development of production techniques and economies.

This creative approach to instrumentation has earned the respect and confidence of food men in every section of the country. It puts a unique combination of men, ideas and experience with Food Industry problems at your service . . . to engineer a control system specifically suited to your purpose. Call in our local engineering representative today . . . he is as near as your phone! *Or write*:

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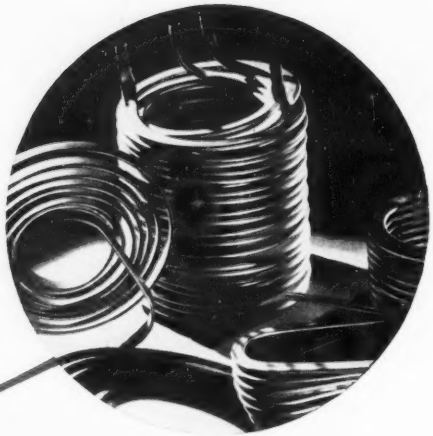

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reduced operating costs

with TRENTWELD beverage tubing

TRENTWELD features that meet your needs!

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More and more manufacturers and users of brewery equipment are finding that modernization with TRENTWELD Stainless Steel Beverage Tubing is a direct means for cutting costs and keeping production lines running smoothly. TRENTWELD in tap rods, cooling coils, beer lines . . . is daily performing exceptional service in hundreds of brewery applications.

TRENTWELD Beverage Tubing is made in a *tube* mill by *tube* engineers who roll and weld stainless and high alloy tubing *exclusively*. That means you're assured quality tubing to meet your strictest requirements. And you get delivery on time because of Trent's convenient mid-continent location.

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In HOT or COLD, HARD or SOFT WATER, NYTRON cleans thoroughly . . . rinses completely without leaving a sticky residue or deposit.

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It lowers the cost of your cleaning operations because less is required to do a thorough cleaning job! *It increases efficiency* because it combines powerful cleaning action with dependable safety! Here are the details of what NYTRON can do for you . . .

. . . NYTRON cleans walls, floors and painted surfaces without removing paint, without affecting tinned or plated surfaces. It washes tile and glassware without streaking; it completely removes oils, fats and greases. NYTRON rinses thoroughly and quickly—even in cold water—leaving no film or deposit to harbor bacteria. It works equally well in hard or soft water . . . leaves no cloudiness, no spots even in the hardest water. And NYTRON is safe, mild and non-toxic—will not affect normal skin!

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—as well as detailed information and technical data on its uses in the food industry—are available on request. Get all the facts . . . see for yourself how NYTRON can help your business operate more efficiently, more profitably. Mail the coupon today.

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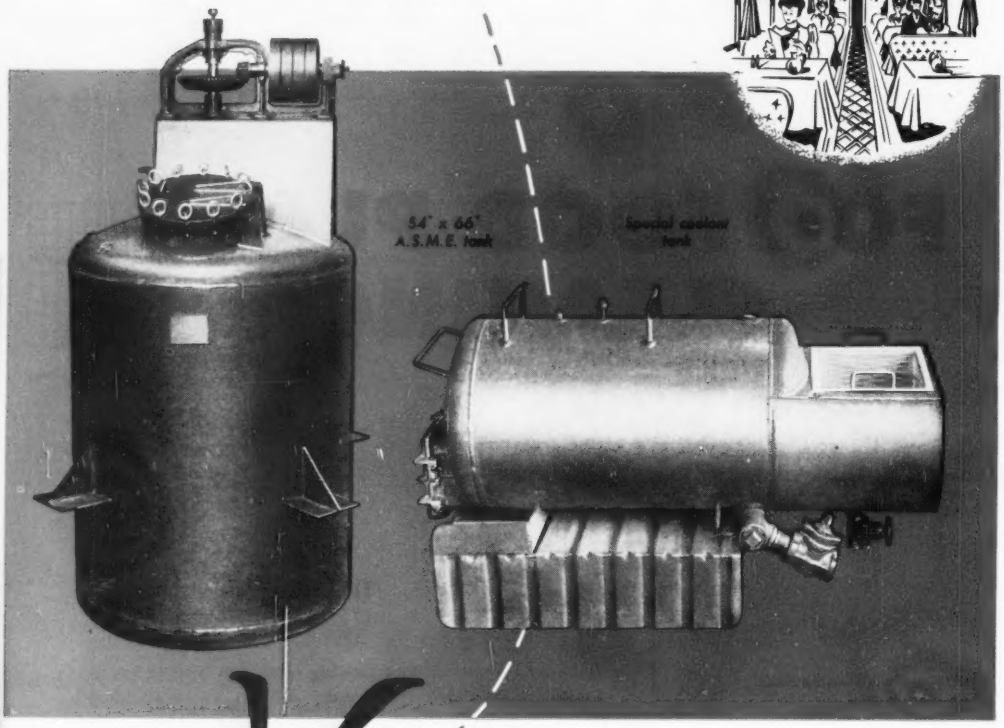

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During this epic period in our country's history, KOVEN, too, was making great strides in helping the nation's food industry find faster, more economical production methods. Because each KOVEN unit is designed and fabricated to do a specific job, it functions more smoothly and at less cost. Call or write KOVEN today. Our complete, modern facilities include: machine, sheet and plate, welding and galvanizing shops, X-ray equipment and stress-relieving furnace.

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"Hit-or-miss" processing bites where it hurts!

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"GUESS METHODS" or hand-operated valves can never govern temperatures as efficiently or economically as Sylphon Controls.

Just see how Sylphon Controls can save for you! They operate automatically, maintain temperature that assures *uniform* processing conditions. Product quality stays constant. Spoilage and wasteful overheating are prevented. Man-hours, manpower and fuel are saved.

Wherever temperatures must be held constant—hour after hour—day after day—you can depend on Sylphon Controls. Self-powered. Simple in construction and operation. Rugged, long-lasting—some have been in constant use for 30 years!

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Sylphon Temperature Regulator 973—one of the complete Sylphon line. Available with dial indicating thermometer. Can be supplied with fin type bulb for controlling temperature of air or gases.

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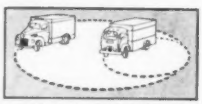
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ALL THE WAY from Denver to Dallas, this new White 3000 rolling billboard tells the story of Fritos—golden chips of corn fresh from ovens to thousands of stores all along the route.

It's a story of meeting close schedules on this 1800 mile trip . . . of fuel economy . . . dependability . . , from the panhandle of Texas to the mile-high city of Denver.

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Ask your White Representative for facts about the White 3000 for your business

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For more than 50 years the greatest name in trucks

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For fourteen years STANOIL Industrial Oils have proved their ability to handle a wide variety of jobs in midwest plants. Now, these established products have been made better than ever! They offer new and important savings in an even wider variety of equipment because:

1. **Greater oxidation stability** in the New STANOILS enables them to stand up under high temperatures of operation, maintain low acidity for long periods of time, and reduce to the minimum deposits caused by oil oxidation.

2. **High Viscosity Index and Low Pour Point** enable STANOILS to perform satisfactorily through a wide range of temperatures. They flow readily at low temperatures and do not thin out excessively at high temperatures.

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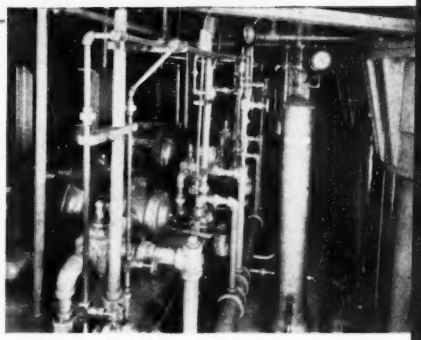
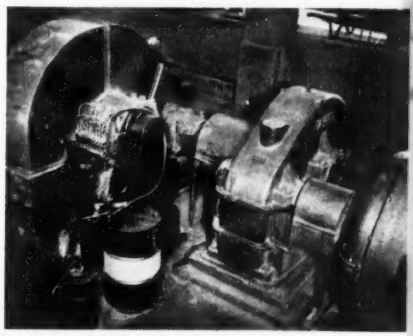
At the right are shown several types of equipment in which the New STANOILS can save you money and maintenance time. A Standard Oil Lubrication specialist will help you find still other applications where versatile STANOILS can replace many special-purpose oils. You can reach this man quickly and easily through your local Standard Oil Company (Indiana) office. Contact him today. Or, if you wish, write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.



In Hydraulic Systems. Because of the high viscosity index and low pour point of the New STANOILS, they provide smooth operation in hydraulic systems regardless of widely varying temperatures. They also eliminate foaming, which is frequently troublesome in hydraulic operation. Their high oxidation stability eliminates deposits that could cause valve sticking and wear.

In Compressors. Because of the oxidation stability and low carbon-forming characteristics of STANOILS, carbon deposits on valves are reduced in air-compressor operation. The New STANOILS separate readily from water—no troublesome emulsions in compressor crankcases.



In Reduction Gears. Because of STANOIL's resistance to acidity and to deposit formation, gear cases of reduction gears remain clean. The oil may be used for longer periods with no danger of excessive wear of gears and bearings.

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"Need a big talking point? try **Vitamin A!"**

IT'S often surprising what one good new "talking point" can do to a sales curve. If *yours* could stand improvement, it will pay you to look into the possibilities of enriching your product with DPi Vitamin A.

Like many others, you may find that this taste-free, odor-free natural concentrate has the right appeal on your label to put new life into an old product.

Or you may find that Myvax 16 Synthetic Vitamin A Palmitate with its unique stability permits foods to be A-enriched that couldn't be till now.

Let's talk about *your* product and vitamin A. It could be a mighty profitable conversation—for *you!* To arrange a date with the world's foremost specialists in vitamin A, simply write to ***Distillation Products Industries,*** 723 Ridge Road West, Rochester 3, N Y (Division of Eastman Kodak Company). Sales offices: 570 Lexington Avenue, New York 22, N. Y. • 135 South LaSalle Street, Chicago 3, Ill. • Gillies & Loughlin, Los Angeles and San Francisco • Charles Albert Smith, Ltd., Montreal and Toronto.

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- Greater Compactness
- Higher Accuracy
- Lower Sample Consumption
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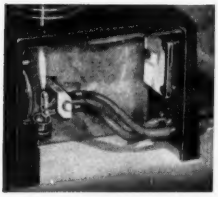
THE NEW BECKMAN
Flame Photometry Attachment

FOR BECKMAN "DU" SPECTROPHOTOMETERS

To meet the steadily growing interest in flame spectrophotometric methods, Beckman engineers have developed a new Flame Photometry Attachment that sets greatly advanced standards of compactness, convenience, accuracy and simplicity.

Used with the Beckman "DU" Spectrophotometer and standard oxy-hydrogen or oxy-acetylene equipment, it combines the unusually high accuracy and resolution of the well-known Beckman "DU" with the conveniences of flame spectrophotometric methods, providing an instrument capable of the quantitative determination of more than 40 elements, including heavy metals and rare earths, as well as the alkali metals.

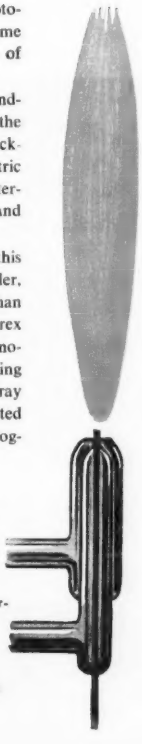


The atomizer-burner of this new instrument is much smaller, simpler and more trouble-free than previous designs. Made of Pyrex with a straight, large-diameter, noble-metal atomizer tube discharging directly into the flame, it will spray even cloudy or highly concentrated solutions indefinitely without clogging or "drifts".

Other important features of this new Beckman development are outlined at right. Best of all, this new instrument is available at a new low price for equipment of this quality. Your nearest authorized Beckman Instrument dealer will gladly supply full details—or write direct!

BECKMAN INSTRUMENTS INC.

Illustration at right shows atomizer-burner actual size.



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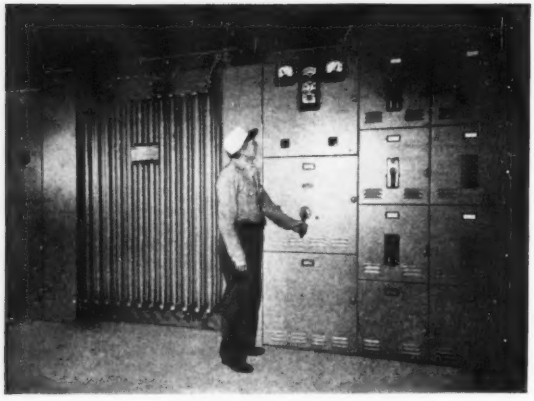
Outstanding Features of the New Beckman Flame Photometry Attachment

- Sample beaker is supported in a unique mechanism that swings the beaker outside the case for easy filling, or swings it back into position below the burner tube. Further, as the beaker is raised into position below the burner, it automatically tips so that sample solution is drawn from lowest point in beaker. Thus, complete analyses can be made with even extremely small samples.
- The atomizer requires only about 2 ml of sample solution per minute, and a sample of 1 to 3 ml is ample for determination of several constituents.
- Fuel consumption is very low—about 5 cu. ft./hr. for acetylene, 8 cu. ft./hr. for oxygen, 20 cu. ft./hr. for hydrogen.
- The hot flame, coupled with the high resolution of the "DU" Spectrophotometer, permits unusually narrow band widths to be used—less than 10 millimicrons for most determinations. Accuracies of 0.5% or better are obtainable.
- Sample concentration is unimportant (provided it is above the lower detectable limit) permitting maximum versatility and convenience in making analyses.
- Although the sensitivity of most elements is improved when the elements are in water solution, nonaqueous solutions are as easily handled as water. Even combustible solvents can be used—and in fact, organic solvents frequently increase sensitivity of the readings.
- The atomizer-burner, sample-positioning device, focusing mirror and adjustments are all unitized into a compact, cast-metal housing. All necessary regulators and gauges (except standard regulators on fuel and oxygen tanks) are conveniently mounted on a separate control panel.

Write for complete details on this important new Beckman advancement!

MODERNIZED POWER SYSTEMS provide production continuity

Food processors keep abreast of plant expansions with co-ordinated General Electric power distribution systems

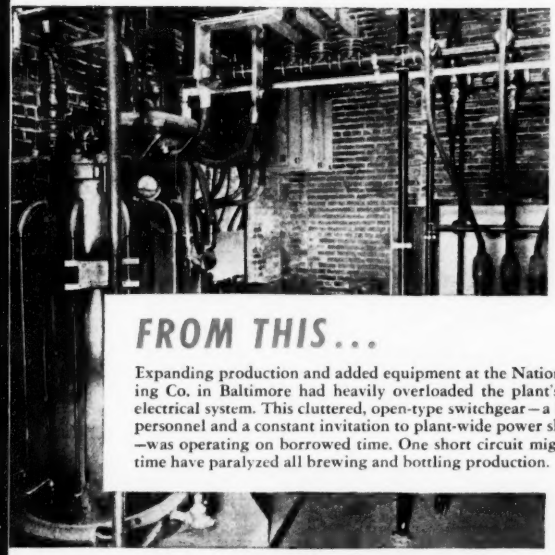


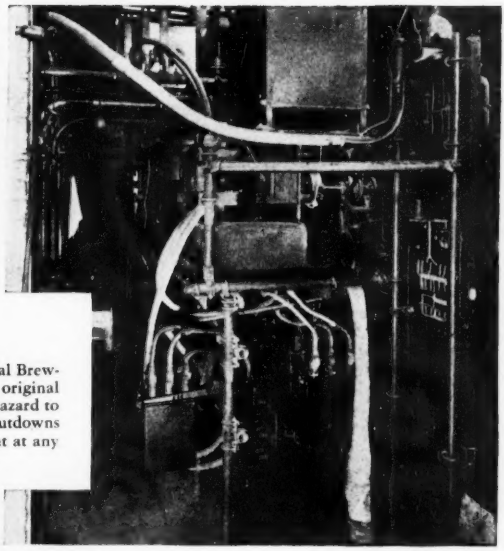
G-E load-center unit substations, factory-assembled and wired, are quickly, inexpensively installed. This 750-kva unit is in the St. Joseph, Mo. plant of the Quaker Oats Co.

America's growing appetite has made its food industry fourth largest in use of electric energy. But expansion in many food plants has left the electrical system lagging behind. If stepped-up loads in *your* plant are still being met with obsolete equipment and makeshift circuit arrangements, ask your G-E representative about installing a modern co-ordinated G-E system—safer, cleaner, easier to maintain, and with greater capacity to meet future growth. Meanwhile, send for Bulletin GEA-3592 on G-E load-center unit substations, and ask to see G-E's "More Power to America" color sound slidefilm, "Modern Industrial Power Distribution." *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

652-B





FROM THIS...

Expanding production and added equipment at the National Brewing Co. in Baltimore had heavily overloaded the plant's original electrical system. This cluttered, open-type switchgear—a hazard to personnel and a constant invitation to plant-wide power shutdowns—was operating on borrowed time. One short circuit might at any time have paralyzed all brewing and bottling production.

...TO THIS!

Recently all this was replaced by modern G-E metal-clad switchgear (right) for the incoming and outgoing 13.8-kv feeders, with draw-out type circuit breakers providing a safe margin against short-circuit damage. From the switchgear, power flows to the 1500-kva G-E load-center unit substation (left), which steps down voltage for use at plant motors. Now workers are protected against contact with live parts, and valuable floor space is saved.

GE POWER DISTRIBUTION SYSTEMS
for food plants

"SCREENING COFFEE"—AN ORIGINAL LITHOGRAPH BY HENRY WINZENREID

"There's an awful lot of coffee in Brazil"*

. . . but like hundreds of other good things, coffee needs the help of tailor-made protective papers to bring it roaster-fresh to your home. That's why millions of attractive and economical coffee bags are lined with a special type of Riegel Glassine.

There's a Riegel Paper for almost any requirement you may have in protective packaging . . . a paper you can depend on for economy and production efficiency. We feel sure we can serve you in the same effective manner we now serve the sales leaders in so many different fields. Write us today and tell us what you want. **Riegel Paper Corporation • 342 Madison Ave., N. Y. 17.**

*Permission granted by Valiant Music Co., Inc.,

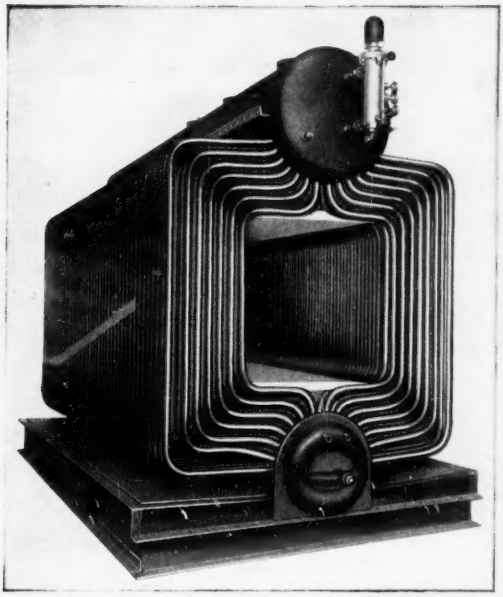
Riegel TAILOR-MADE PAPERS FOR PROTECTIVE PACKAGING

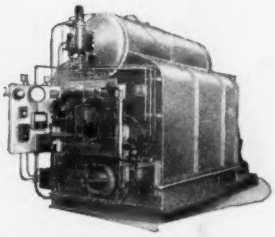
ERIE CITY

KEYSTONE

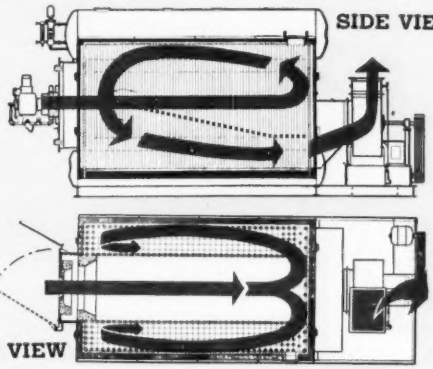
STEAM GENERATOR

2-DRUM · WATER TUBE DESIGN IN A COMPACT STEAM GENERATOR





Here's big boiler performance in small cubage. Keystone combines in a factory assembled unit: low head 2-drum water tube boiler complete with boiler trim, a heavily insulated steel casing—automatic burner for gas, oil or both interchangeably—induced draft equipment and instrument panel with all controls mounted. Complete range of sizes from 75 to 800 hp. at pressures from 160 p.s.i. Write for Bulletin SB-38.



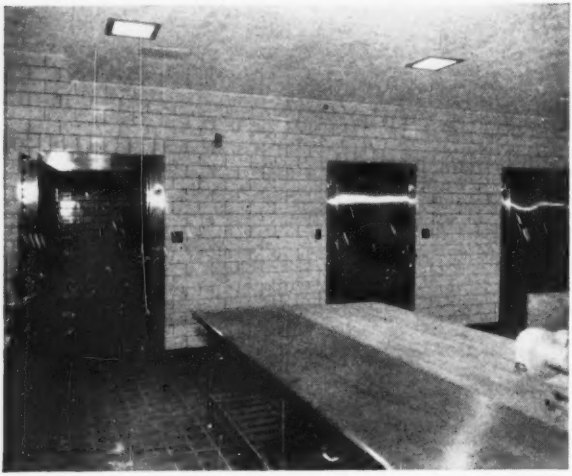
Hot gases contact solid side banks of water tubes in first pass to the rear of the Keystone, divide to left and right and are deflected upwards and over inclined baffles in both side water tube elements, again contacting bare metal heating surfaces—make return or third pass under these baffles, contacting bare metal again in the return trip to the rear and out of the boiler. Quiet induced draft fan provides all the draft required for top ratings. Spent gases need only be vented. No stack is required.

ERIE CITY IRON WORKS *1452 East Ave.* **ERIE, PA.**

Gleaming Sanitary

JAMISON STAINLESS CLAD DOORS

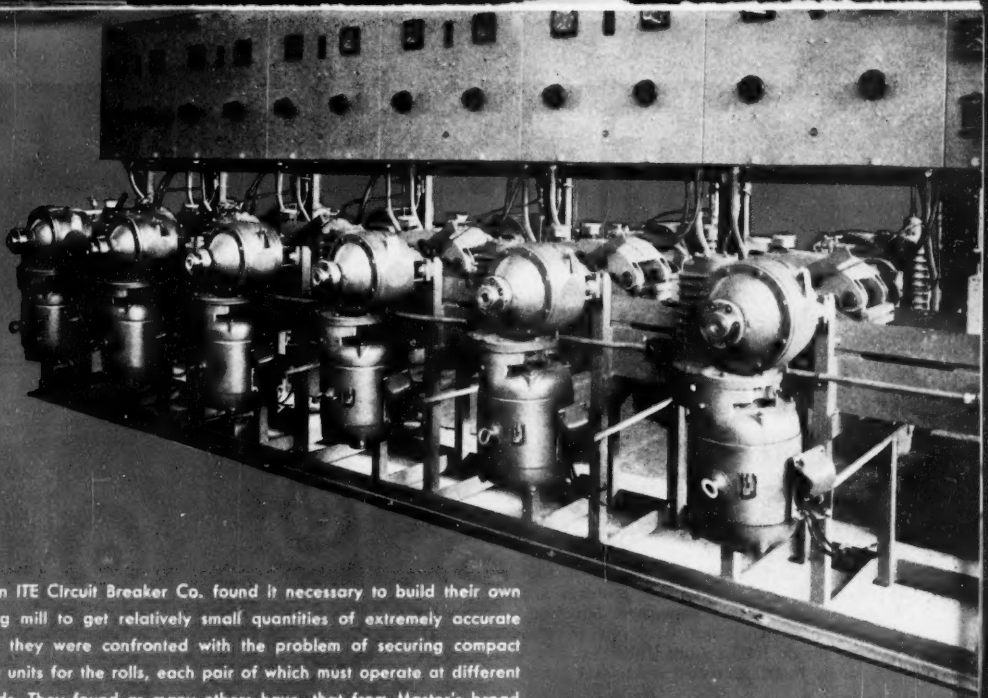
Jamison Stainless Steel Clad Cold Storage Doors Match the Beautiful, Sanitary, Modern Equipment in the New Kitchen at Mt. Sinai Hospital, Cleveland, Ohio.



For Cold Storage Use in Institutional Kitchens

There is a Leader in every field . . . the standout which is often imitated but never duplicated. In the cold storage door field, the most distinguished name is JAMISON. To read the list of Jamison installations would be like reading the "Who's Who" in American industry, plus the finest, most beautiful, and most modern hospitals, hotels and other institutions. From top to bottom . . . inside and outside . . . from glistening, enduring Stainless Steel to chrome-plated hardware . . . from sleek design and sturdy construction, Jamison Doors are second-to-none the world over. Your best investment in years of beauty and utility . . . there is a design, size and price for every purpose. See them all in Catalog 175. Jamison Cold Storage Door Company, Hagerstown, Md., U.S.A.

The leader for over 50 years



When ITE Circuit Breaker Co. found it necessary to build their own rolling mill to get relatively small quantities of extremely accurate strip, they were confronted with the problem of securing compact drive units for the rolls, each pair of which must operate at different speeds. They found as many others have, that from Master's broad line of Gearmotors they could select standard units which would give them the RIGHT horsepower, the RIGHT shaft speed in one compact unit that they could use RIGHT where they wanted it.

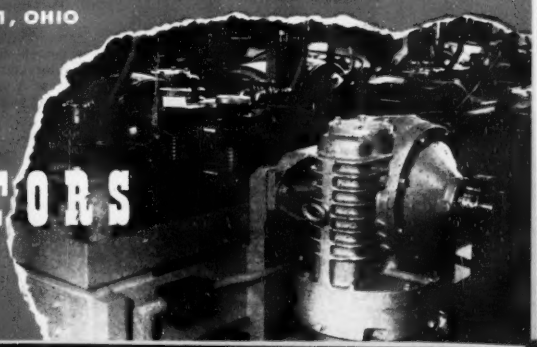
Probably you will never design a rolling mill. But the next time you need motor drives for your plant or product, remember that Master Motors, available in thousands and thousands of types and ratings, give you a selection you can get nowhere else.

tough problem . . . easy solution

Open, enclosed, splash proof, fan-cooled, explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 432 to 1 ratio . . . with electric brakes . . . with mechanical variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best motor drive for YOU.

Select the RIGHT power drive from Master's broad line and you can increase the saleability of your motor driven products . . . improve the economy and productivity of your plant equipment.

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO



MASTER GEARMOTORS

NOTES for Process Engineers

C. H. Wheeler OF PHILADELPHIA

COOLING TOWERS—VACUUM REFRIGERATION—HIGH VACUUM PROCESS EQUIPMENT—MICRO-PARTICLE REDUCTION MILLS—STEAM CONDENSERS—STEAM JET EJECTORS—MARINE CONDENSERS & EJECTORS—DECK MACHINERY

YOU MAY BE ABLE TO LOWER YOUR REFRIGERATION COSTS

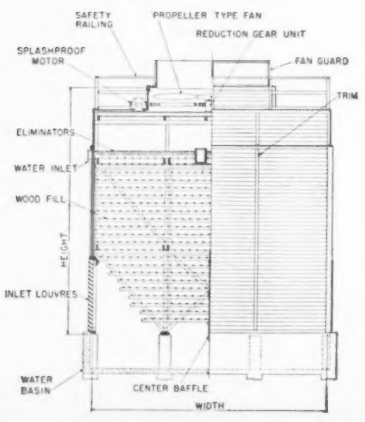
INVESTIGATE C. H. WHEELER STEAM JET VACUUM REFRIGERATION SYSTEMS

Where your chilled water temperature requirements are 35° to 65° F and you have live steam available, C. H. Wheeler engineers are experts at effecting refrigeration savings. They work out hook-ups of standard C. H. Wheeler Steam Jet Vacuum Units that afford lowest first cost, lowest installation cost and lowest maintenance cost.

C. H. Wheeler pioneered and has been a leader for many years in the installation of Steam Jet Vacuum Refrigeration Systems . . . for finishing rolls in the paper and rubber industries, for sulphite mills and other places employing acid recovery apparatus of the absorption type, for distillation processes in oil refineries, and for many phases of food processing.

A 36-page book on C. H. Wheeler Steam Jet Ejectors will be mailed you on request. It will augment your store of knowledge on the subject and suggest cures for "refrigeration headaches" in your plant.

Induced Draft Cooling Tower of Redwood Construction

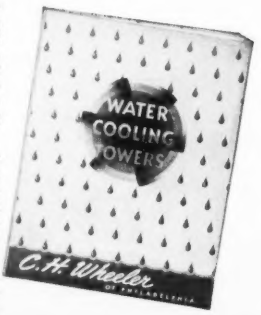


$13,500 ESTIMATED SAVINGS IN 6 YEARS WITH A C. H. WHEELER COOLING TOWER

A C. H. Wheeler customer worked out his own engineering estimate of the savings assured through the purchase of a 3-cell C. H. Wheeler Cooling Tower of 12,500 GPM capacity. He chose C. H. Wheeler over a competitive 2-cell tower costing $10,000 less. The greater efficiency of C. H. Wheeler tower engineering results in estimated yearly operating savings of $2,261.

The formula employed by the customer and a tabulation of his figures has been reproduced for your appraisal. This, together with Catalog 145, will augment your knowledge of cooling tower operation. A request on your company letterhead will bring them by return mail.

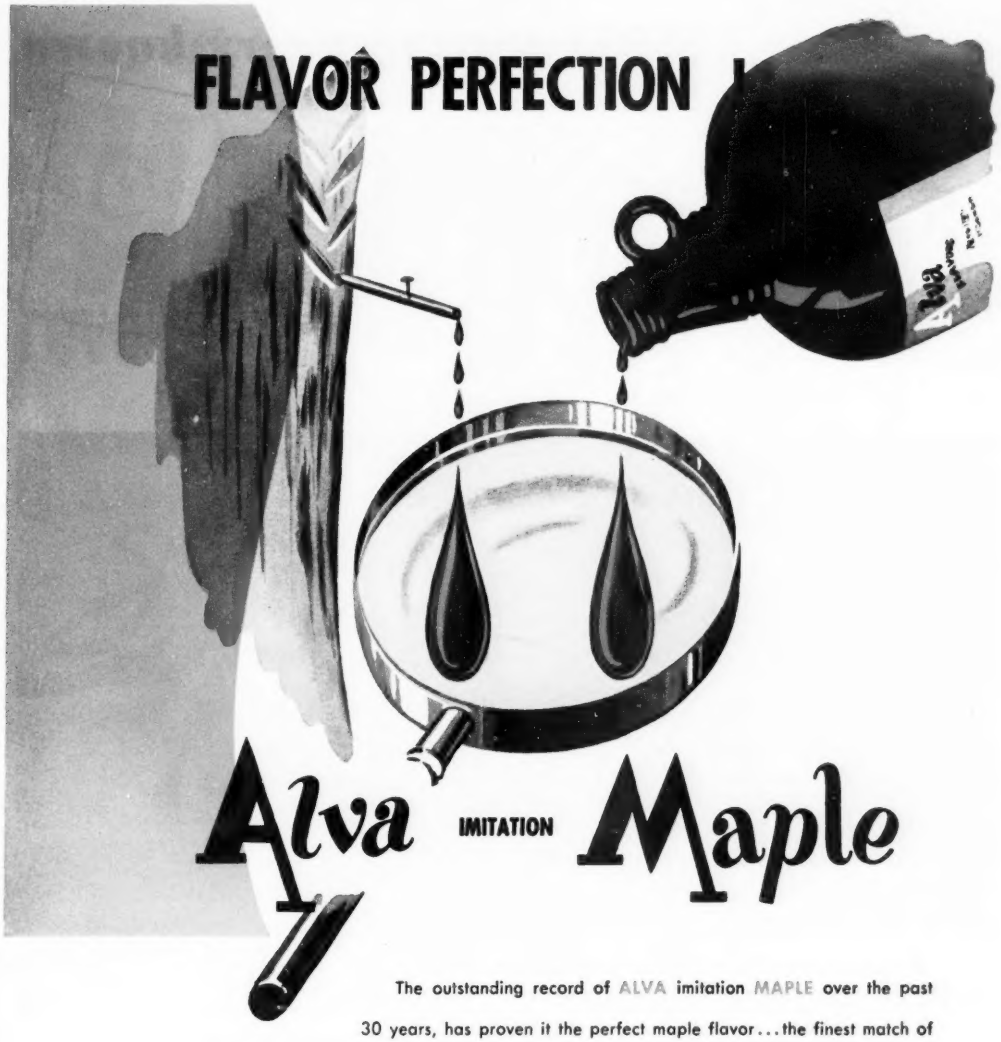
Be sure to call a C. H. Wheeler representative early in your cooling tower plans. He shows you where to check for features of quality.



C. H. WHEELER MANUFACTURING CO., 1828 SEDGLEY AVE., PHILADELPHIA 32, PA.

REPRESENTATIVES IN MOST PRINCIPAL CITIES

FLAVOR PERFECTION



Alva IMITATION Maple

The outstanding record of ALVA imitation MAPLE over the past 30 years, has proven it the perfect maple flavor... the finest match of the true flavor goodness of real sugar maple for baking, confections, ice-cream, extracts and syrup. On the basis of price, ALVA MAPLE will please you too. If you are not using ALVA MAPLE now... write us for a sample.

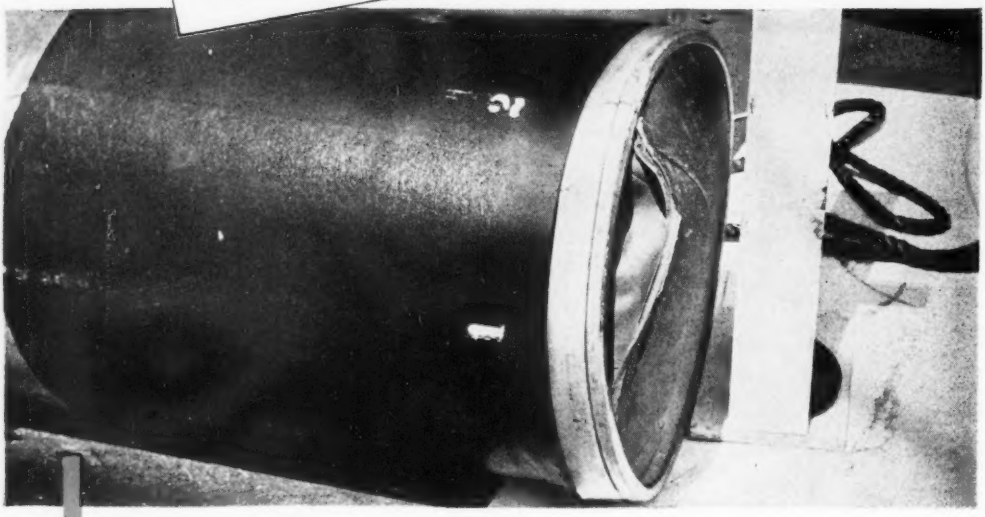
Do you have your copy of the complete Alva Flavors Catalog?

VAN AMERINGEN-HAEBLER, INC.
521 WEST 57th STREET, NEW YORK 19, N. Y.

Alva FLAVORS

After testing every known

it's VISQUEEN*



A close-up of an FPEB drum-package dropped twice from a height of two feet on its bottom chime, at an angle of approximately 45 degrees. Although the fibre bottom pulled out of the metal chime, the envelope —made of VISQUEEN—did not leak.

Development of the Rohm & Haas FPEB drum-package introduces an entirely new concept into liquid shipping. Basically the FPEB drum-package is a specially constructed fiber drum with a separate VISQUEEN liner and a "boot," thoroughly tested to be satisfactory under normal handling abuse, 50 to 75% lighter than alternative containers.

It's another of the jobs that VISQUEEN *film does best!*

HERE'S WHY: VISQUEEN film has exceptionally high tensile strength and tear resistance . . . yet always remains flexible and uniform. Clear, odorless, tasteless and impervious—VISQUEEN is chemically inert, unaffected by acids or alkalis.

Regardless of what YOU ship (liquids, semi-liquids or solids) or where YOU ship, or how YOU ship (in fibre drums, cartons or metal containers) . . . it's almost certain that VISQUEEN film liners will save you money, save you time and save you handling!

*T. M. VISKING CORPORATION †FPEB is the designation for Rohm & Haas' Visqueen-lined drum package with boot.

competitive polyethylene film . . .

liners for Rohm & Haas' revolutionary FPEB† drum-package!

VISQUEEN envelope and VISQUEEN sealing disc are photographed with the other component parts of the FPEB drum package. The assembled unit—effected by mandrelling—has been proved capable of carrying 400 lbs. of liquids successfully under all kinds of normal handling abuse.

Ready for filling with 400 lbs. of nonflammable, noncorrosive liquid is this completely assembled FPEB drum-package. Note how the VISQUEEN envelope overlays the top chime of the drum. Complete product protection is provided by the top sealing disc, which is also made of VISQUEEN.

VISQUEEN film is all polyethylene, but all polyethylene film is not VISQUEEN. VISQUEEN is the only film produced by the process covered by U. S. Patent No. 2461975. Only VISQUEEN film has the benefit of the research and extensive technical experience of The Visking Corporation, pioneers in the development of polyethylene film. Be sure. Always specify VISQUEEN film for superior tear and tensile strength and greater uniformity.

VISQUEEN FILM . . . A PRODUCT OF THE

VISKING

CORPORATION

PRESTON DIVISION • TERRE HAUTE, INDIANA

In Canada, Visking Limited, Lindsay, Ontario

58 Countries

all over the World have

Service and Parts

facilities for

Hyster Lift Trucks

EVERY HYSTER DEALER IS A LIFT TRUCK SERVICE AND PARTS STATION. He has factory-trained mechanics skilled in maintenance and repair. He has an adequate supply of genuine Hyster parts. His service is quick, courteous, efficient.

Hyster Lift Trucks (7 models) range in capacity from 2,000 to 30,000 pounds. Hyster *Salsbury* Turret Trucks (4 models) for horizontal materials handling.

Call your nearest Hyster dealer when you need fast service and parts delivery.

HYSTER® COMPANY

THREE FACTORIES

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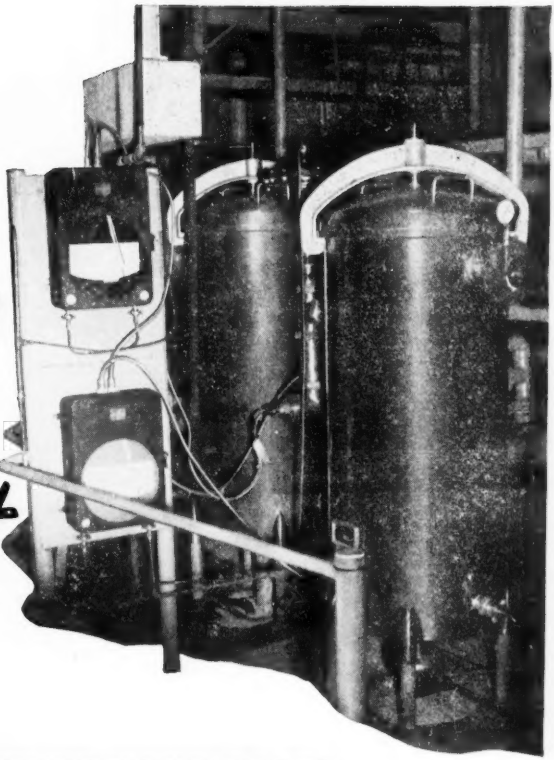
1802-35 NORTH ADAMS STREET, PEORIA 1, ILLINOIS
1010-35 MEYERS STREET.....DANVILLE, ILLINOIS

air in your product



CAN TAKE THE WIND OUT OF YOUR SALES

Yes, a little thing like excessive oxygen in your product can materially affect your sales. Dissolved air can destroy product appearance . . . adversely affect flavor, color, aroma and vitamin content.

Rex Micro-Film Deaerators can help you put some "push" behind your sales. They effectively remove excess oxygen . . . preserve food flavor, color, vitamins.

For example, in a tomato juice canning plant, Rex Deaerators are used to remove dissolved air prior to the application of heat; an important step in preservation of vitamin C. Rex Deaerators are also used extensively to remove the oxygen bubbles that cause "black neck" and the hard core in tomato catsup.

Why not investigate the possibilities of Rex Micro-Film Deaerators for your operation? Whether you process catsup, tomato juice, soups, fruit juices, baby foods, frozen concentrates, or almost any fluid or semi-fluid product, these efficient units can help you improve product appearance and flavor . . . help step up sales. For all the facts, mail the coupon.

SO-2020

Chain Belt Company
1616 West Bruce St., Milwaukee 4, Wis.
Gentlemen:
( ) Please send me a copy of Bulletin 47-1
( ) I would prefer to have a Rex Food Processing expert call on me.

Name.....

Company.....*Dept.*.....

Address.....

City.....*State*.....

CHAIN BELT COMPANY REX

. . . FOOD PROCESSING EQUIPMENT

SOME *move easier than others!*

For some food packages, there's an unseen groove straight from the self-service shelf to the waiting cart. These favored packages move so much more easily, so much faster than others!

WHY? What part does packaging strategy play in their success? Which type of package travels that unseen groove most easily?

In this era of universal self-service, a great many types of food move easily from the shelf into the waiting cart. Almost any good food product, properly merchandised and reasonably well packaged, can be moved along this route to the cash register.

The only trouble is—*some move so much more readily than others!*

Just at that crucial moment when the shopper's hand decides where to light, some packages get more than their share of the breaks. Somehow, an invisible groove seems to guide those shopping hands, over and over.

No accident, this!

The influences that culminate when a self-service shopper's hand flashes out toward the

GLASS + VAPOR VACUUM ... foundation stone in

shelf are many and complex. Most of them call for years of campaigning and huge investments to become fully operated.

But there's one of these forces (one of the most powerful of all) which is almost instantly available to any good food packer. *This force is the glass package topped with the Vapor-Vacuum Seal.*

Glass+Vapor-Vacuum expedites self-service as no other packaging device can. Such a package has all the elements needed to make automatic selling run smoothly.

Glass+Vapor-Vacuum makes a package which can do all its own explaining . . . a package which attracts favorable attention and stimulates buying appetite as no other package can.

Then, after it's bought and opened, *this package delivers!* Because of the unfailing protection of the Vapor-Vacuum method, *every* package opens up fresh, flavorful, unchanged *—every time!*

What greater contribution to consumer faith?

The popularity of self-service in food stores has been, largely, a development of the last 2 decades. It's these same 2 decades, too, in which Vapor-Vacuum has been at work. There can be no doubt that these 2 facts are closely related. *Tens of billions of times*, during these 20 years, consumers have bought Vapor-Vacuum sealed glass packages, have opened them, and have learned once more that Glass+Vapor-Vacuum is a completely dependable protector of quality.

Every Vapor-Vacuum sealed package, therefore, has a dual advantage: *(1) It helps the sales of the packer who uses it. (2) It helps to build and maintain consumer faith.*

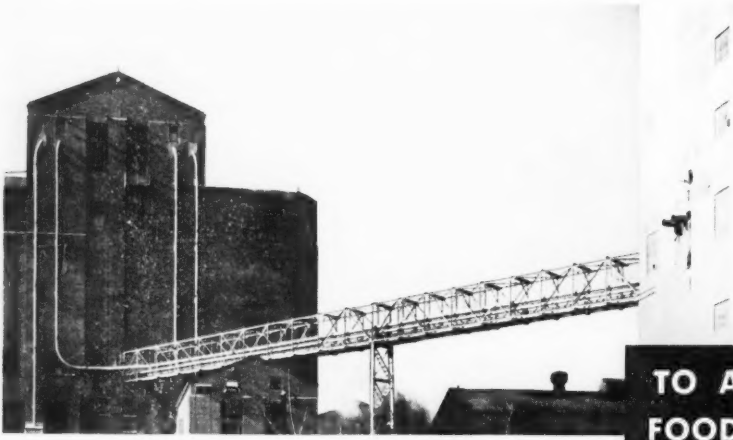
What more could any package do?

Top brand jams and jellies (the ones which travel from shelf to shopper's cart most easily) are usually packaged in Glass+Vapor-Vacuum. Whether they use the Vapor-Vacuum Tumbler Cap, the regular Whitecap, or the Wide-mouth Slip-on, these packages are all exactly right for modern self-service merchandising.

FLOW FOODSTUFFS and save

FULLER AIRVEYOR® BRINGS *New*

Speed
Economy
Safety
Sanitation



Here's the conveying system that obsoletes all other methods of handling dry, pulverized and granular materials—the method that sets entirely new standards of convenience, speed, cleanliness, economy and safety.

TO ALL TYPES OF FOOD PROCESSING PLANTS

THE AIRVEYOR® FLOWS FOODSTUFFS FROM CARS TO STORAGE, STORAGE TO PROCESS—SIMPLIFIES PROBLEMS OF UNLOADING AND TRANSPORT

There are few moving parts. This means that maintenance is reduced, reliability stepped up. Sharp turns and pockets where material might accumulate and infestation occur are eliminated by the simple duct or pipe system. The entire system is self-cleaning—100% retention of all visible dust is assured.

Food processing plants of every size, handling dry foodstuffs of every description, are finding the Airveyor is the most practical and satisfactory way of moving materials in bulk. Investigation will show you why. How about asking a Fuller Engineer to survey your plant and make his suggestions? There's no obligation.

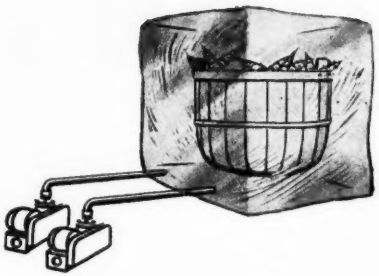
Fuller

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS—COMPRESSORS AND VACUUM PUMPS—FEEDERS, AND ASSOCIATED EQUIPMENT

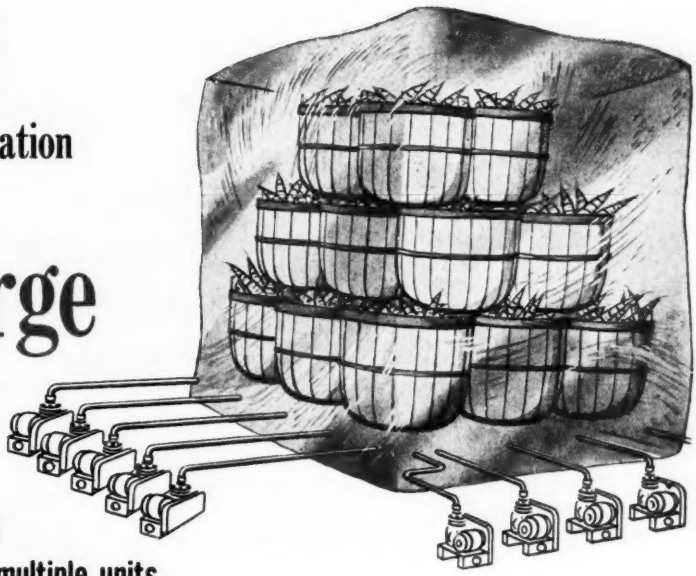
FULLER COMPANY
Catasauqua, Pa.
120 S. La Salle St., Chicago 3
420 Chancery Building, San Francisco 4

7300

A-117



Small refrigeration job or Large



There's extra safety and flexibility with "Freon" multiple units

Multiple units using "Freon" safe refrigerants offer you maximum flexibility in freezing or storing any quantity of food . . . large or small.

Such units cost comparatively little to install, can provide any capacity of refrigeration . . . and may be cut in or out (individually or in groups) as required.

No large, expensive stand-by equipment is needed in a multiple-unit system of this type. The full complement of machines included in the circuit will meet practically all emergencies. And since all units in the system are alike, spare parts in stock are held at a minimum.

"Freon" is the most widely used refrigerant in multiple-unit systems. It's truly safe . . . virtually nontoxic, nonflammable, nonexplosive. It has no taste or odor, and is stable and inert. And it's completely harmless to food. In fact, foods can be stored or processed right in machine areas with no fear of contamination from refrigerant leakage.

Get complete information about "Freon" and the modern use of multiple units. Write: E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Division, Wilmington 98, Delaware.

Look at these multiple-unit advantages:

1. Adaptable to any-size job
2. Low installation cost
3. Wide variation in capacity
4. Fewer spare parts
5. No expensive stand-by equipment

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

KINETIC

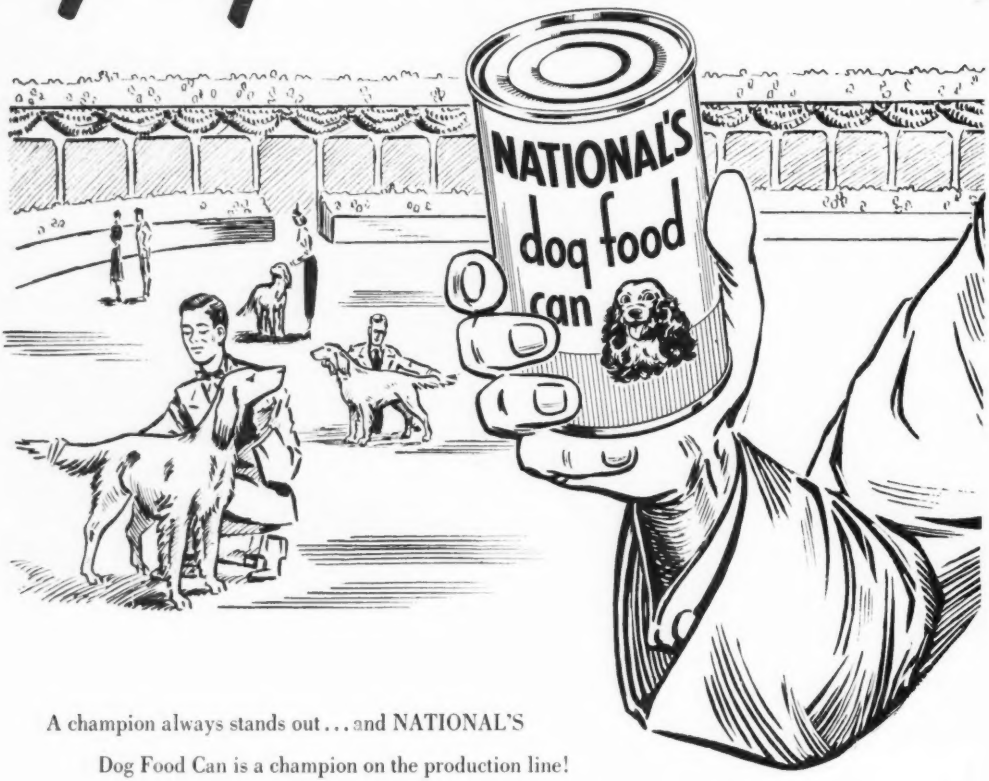
FREON

SAFE REFRIGERANTS

"Freon" is Du Pont's registered trade-mark for its fluorinated hydrocarbon refrigerants

NATIONAL CANS

Going Places---



A champion always stands out . . . and NATIONAL'S
Dog Food Can is a champion on the production line!
You'll award it a "Blue Ribbon" for its superior
construction and for its improved stabilized interior linings.
We'll be glad to show you how a champion
NATIONAL can will help your product "go places."
Why not phone or write, today!

50 YEARS OF SERVICE
NATIONAL CAN CORPORATION
1901 • 1951

NATIONAL CAN
CORPORATION
110 EAST 42nd STREET, NEW YORK 17, N.Y.

Young George, they say, liked cherry pie,
And that may be the reason why
He did that fancy job of chopping,
Which made the young man's father hopping
Mad. Too bad. Don't use a hatchet.
Use **Norda Cherry!** Try to match it!

Cherry flavor should taste like cherry. Norda Cherry Flavor does.

Its tart-sweet cherry richness seems as real as fruit freshly picked. Its excellence comes from fine ingredients, experience, skilled care.

Your sales show you what a favorite cherry is. Improve your cherry-flavored gelatins, mixes, candies, and syrups with Norda genuine and superb imitation Cherry Flavor. You'll sell more, we believe.

Make a test—that's best—with generous free samples of Norda Cherry. Send for them today.

Norda Cherry . . .
Another "Favorite to Flavor It"

Norda

ESSENTIAL OIL AND
CHEMICAL COMPANY, INC.
601 West 26th Street, New York 1, N. Y.

CHICAGO • LOS ANGELES • ST. PAUL • MONTREAL • TORONTO • HAVANA • MEXICO CITY • LONDON • PARIS

MicroRold® 430 polished sheets now available

During the current critical nickel shortage, the same close tolerance and uniformity of gauge that have made MicroRold 18-8 so outstanding are now being incorporated in MicroRold 430.

It is important that the individual end use be discussed with your distributor or with our metallurgical department.

MicroRold 430 has moderate ductility, good forming and bending characteristics, and can be drawn to a *moderate* degree. It can be brazed and soldered with the same facility as chrome-nickel grades and except where resistance to high stresses is a major factor, it welds satisfactorily by the usual methods.

MicroRold 430 is used extensively for interior architectural trim, bar, restaurant and soda fountain components, table tops, etc. Washington Steel Corp. is currently producing polished sheets in standard sizes, 20 gauge and lighter, to replace chrome-nickel material vitally needed for the national defense program.

WASHINGTON STEEL CORPORATION

Washington, Pennsylvania

For FOIL that FOILS package troubles

...coat with VINYLITE BRAND RESINS

Want to seal quickly—easily? Want to prevent transfer of flavor? Want to keep odors out, freshness in? You can depend on aluminum foil coated with VINYLITE Brand Resins to achieve these goals — and many more!

Heat-sealing, for example! Speedy and certain heat-sealing of foil packages coated with VINYLITE Resins combines utmost airtightness with top dependability, eliminating costly steps.

Color, for example. Available in every conceivable color, transparent or translucent, these resins can be applied over printing to enhance the beauty and luster of your design.

These are just a few of the advantages that these resins are bringing progressive package designers for packing foods and materials of many kinds. Besides heat-sealability, color, printability, and freedom from odor or flavor transfer, the properties include strong resistance to water, moisture absorption, oils, greases, alkalies, and most strong acids. They are odorless, too, and tasteless.

Whatever the material—foil, paper, metal, cloth—there's a coating based on VINYLITE Brand Resins formulated to assure all-star performance for your packages and containers. Find out more about them today. For complete information, write to Dept. JW-74.

Data courtesy Shellmar Products Corp.
Mount Vernon, Ohio

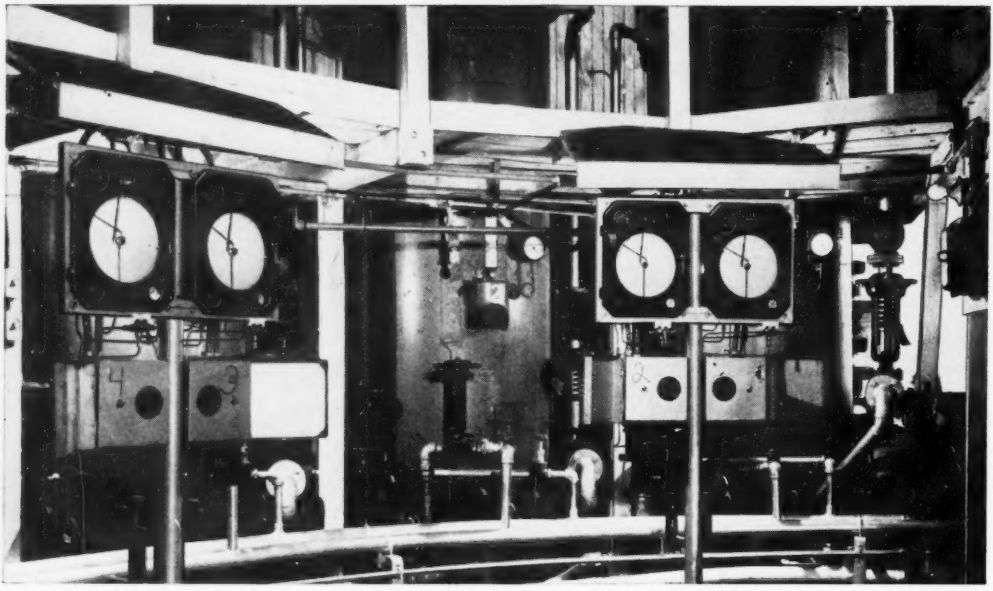
Vinylite
BRAND
RESINS

TRADE MARK

BAKELITE DIVISION
Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

"NEW RETORT CONTROLS SLASHING COSTS!"

say FINE FOODS *of Canada Limited*



New Taylor automatic time and temperature venting control system on retorts at the Ste. Martine, Quebec plant of Fine Foods of Canada Limited

Taylor's Centennial ACCURACY FIRST SINCE 1851

THIS new, highly advanced Taylor automatic control system is helping Fine Foods of Canada Limited produce a greater volume of top quality Green Giant products at lower cost. They are proud to be one of the first to enjoy the benefits of the automatic time and temperature venting system which assures proper venting of *each* retort load in accordance with NCA Research Bureau Recommendations.

Mr. Harold Sjostrom, Company Engineer at Tecumseh, Ontario, reports, "Air pockets completely eliminated from retorts. Uniform processing, load after load". On a time-temperature basis, this new Taylor venting control actually sweeps out air pockets. Result—uniform steam atmosphere inside retorts.

SEE US AT THE CANNER'S SHOW
BOOTH NO. 11

We can supply this time and temperature venting system as an addition to your present retort controls, or as part of a whole new system. Your Taylor Field Engineer can "tailor" this system to your particular needs. Ask him! The low cost will please you. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.*

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

Let You Forget About Atmospheric Hazards

Shown here are four basic types of Century Protected Motors which are designed to resist the dangers of hazardous atmospheres. A properly selected Century motor—with the right protection—is the ideal combination for a long life of satisfactory performance.

1 **Open Protected**—Form J, general purpose motor—meets the needs for most installations where operating conditions are relatively clean and dry. The top half of the motor frame is closed to keep out falling solids or dripping liquids.

2 **Splash Proof Motor**—gives the necessary protection where plants must be washed down—keeps water out of the motor even when a hose is applied directly on the frame. It also provides protection against rain, snow, sleet and ice for outdoor installations.

3 **Totally Enclosed Fan Cooled Motor** — protects against dusts, mist or fog that might be detrimental to the vital parts of the motor. The inner frame protecting the motor is sealed to keep out harmful matter.

4 **Explosion Proof Motor** — protects against atmospheres charged with explosive dusts or gases. They carry Underwriters' label for specific kinds of hazards.

Century builds a complete line of alternating and direct current motors in a wide range of types and kinds—in sizes from 1/6 to 400 horsepower.

Specify Century motors for all your electric power needs.

Popular types of standard ratings are generally available from factory and branch office stocks.

Century Electric Company is celebrating its 50th year in the electrical industry.

-832

Century C MOTORS

CENTURY ELECTRIC COMPANY 1806 Pine Street • St. Louis 3, Missouri

Offices and Stock Points in Principal Cities

SMART PACKAGE MERCHANDISING

Planters smart merchandising approach required an attractive package that would protect the contents, be easy to use and still have eye appeal to the consumer. Stokeswrap met all the requirements plus the fact that the packages are formed, filled and sealed faster at lower cost per unit. Planters pioneered in the use of Stokeswrap and now have over 70 of this type of machine installed throughout their plants.

Stokeswrap is being used in many plants to fill coffee, candies, granules, powders, etc., in Cellophane, Pliofilm, Polyethelene, Foil and heat sealing papers; also tea in porous bags.

Look over your packaging problems and let us help you to put Stokeswrap to work on your packaging line.

Exclusive West Coast Distributor:
Anderson-Barngrover Division of FMC
San Jose 5, California

STOKES & SMITH Co
PACKAGING MACHINERY PAPER BOX MACHINERY
4911 SUMMERDALE AVE. • PHILADELPHIA 24 • PA.

Subsidiary of Food Machinery and Chemical Corporation

fmc

SUCCESSFUL HAULERS TELL YOU WHY...

THE TREND IS TO TRAILMOBILE

HAUL 5 MILLION LBS. MORE A YEAR...EARN $40,000 EXTRA!

Mr. S. S. Heuer, Owner,
Heuer Truck Lines
Marshalltown, Iowa

350,000 ROUGH MILES SOLD ME ON TRAILMOBILE!

L. M. Cromartie,
President, Cromartie
Transport Co.
Wilmington, N. C.

Richard L. Gettig,
Vice Pres. & Gen. Mgr.
Beatty Motor Express,
Inc., Washington, Pa.

SIMPLE ARITHMETIC PROVES IT PAYS TO BUY TRAILMOBILE!

YOU, TOO, CAN BOOST YOUR REVENUE... INCREASE YOUR PAYLOAD

Follow the cost-saving example of hundreds of haulers from coast to coast! Join the big trend to Trailmobile and you, too, will realize boosted revenues through sizeably increased payloads. Rugged, lightweight Trailmobiles on your job will more than offset today's rising operating costs—durable construction will cut your maintenance expense. Get the money-saving facts now!

CHECK and COMPARE!

UP TO 3,200 LBS. BIGGER PAYLOAD REPORTED!

LOAD TESTED IN THE FIELD!

FINE APPEARANCE... EASY TO MAINTAIN!

THE TRAILMOBILE CO.

CINCINNATI 9, OHIO — BERKELEY 2, CALIFORNIA

INVESTIGATE NOW!

TO SIMPLIFY PACKING OF THESE FOODS FOR THE GOVERNMENT...

USE GRIFFITH INGREDIENTS WHICH CONFORM TO QUARTERMASTER SPECIFICATIONS

If Interested in Packing Any of These Items—Other kinds of Canned Foods, or Fresh and Smoked Sausage—we'll Provide You with Dependable Working Formulae

Beans with Frankfurter Chunks in Tomato Sauce, Canned
Frankfurter Seasoning
Beef & Pork Dinner
Beans with Pork, Canned
Beef, Corned, Canned
Beef & Pork Loaf, Canned
Beef & Vegetables with Gravy
Beef & Gravy, Canned
Beef Stew, Canned
Bouillon
Catsup
Chili Con Carne without Beans
Ham Chunks
Ham & Eggs, Chopped
Hamburgers, Canned
Ham Chunks with Candied Sweet Potatoes
Hams, Smoked
Hash, Corned Beef, Canned
Hash, Corned Beef, Dehydrated, Canned
Hash Meat & Vegetables, Canned
Luncheon Meat
Meat & Beans with Tomato Sauce
Meat and Corn
Meat, Ground & Spaghetti
Meat & Noodles, Canned
Meat Balls & Spaghetti, Canned
Mincemeat
Pickles & Pickle Relish
Pork & Apple Sauce, Canned
Pork & Eggs, Chopped, Canned
Pork & Gravy
Sausage, Beef & Pork, in Water, Canned
Sausage Patties, Canned
Sausage, Pork, Canned
Soup and Gravy Base
Soup, Noodle, with Chicken, Dehydrated
Soups, Dehydrated
Stew, Meat & Vegetables, Canned

FOR BETTER TASTE, LESS WASTE—

These Griffith Products are Scientifically Prepared and Laboratory Controlled:

Pepperoyal
Royal Soluble Seasonings
*Purified Seasonings
*Purified Cereal Binders
Vegamine
G-4 Antioxidant
Prague Powder

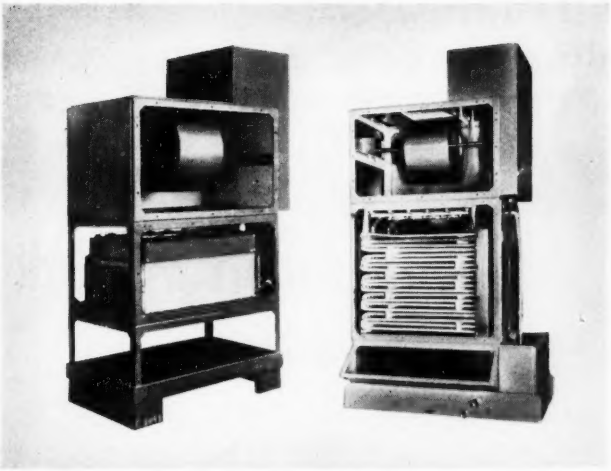
Prague Powder®, made or for use under U. S. Pat. Nos. 2054623, 2054624, 2054625 and 2054626

*U.S. Sterilization Pat. Nos. 2107697, 2189947 and 2189949

The
GRIFFITH LABORATORIES, Inc.

In Canada—The Griffith Laboratories, Ltd.

CHICAGO 9, 1415 W. 37th St. • NEWARK 5, 37 Empire St.
LOS ANGELES 58, 4900 Gifford Ave. • TORONTO 2, 115 George St.



What Make of Product Cooler Will Do Your Job Best?

Here's where the wide selection of cooling and freezing equipment made by Worthington really pays off.

From the complete Worthington line, you can pick exactly the right unit to meet your specifications of:

- medium or low temperature
- automatic defrosting—periodic or continuous
- capacities from 2 to 37 tons of refrigeration
- air circulation rates from 1600 to 16,000 cfm
- direct air discharge or with ductwork
- various arrangements for air inlet and discharge

Worthington's dry-coil type (UCY) for medium and low temperatures uses ammonia or Freon-12 and may be equipped with automatic water defrost. The recirculating-spray (continuous automatic defrost) type (UCZ) uses ammonia or brine. Five sizes of each type. Finned copper coils for high air-contact efficiency with Freon; prime surface steel coils for ammonia or brine.

Features—quick, uniform flow of cold air throughout, no dead spots . . . automatic operation . . . automatic defrosting . . . sectionalized construction with removable panels . . . forward-curved centrifugal fans for quiet operation . . . surge drum and float valve assembly available . . . pump-motor units (also Worthington-made).

FOR LONGEST LIFE—Copper tubes for Freon, hot-dipped galvanized steel tubes for ammonia and brine . . . Sections fabricated from sturdy No. 11-gauge steel angles electrowelded and reinforced with heavy gussets . . . All-steel cover completely covers motor and drive . . . Large-volume drain pan constructed of galvannealed steel, electrowelded . . . Entire unit, including drain pan, bonderized and covered with a rubber-base enamel, containing corrosion-inhibiting metallic powder.

Write for Bulletin C1100-B35.

A-16

WORTHINGTON

AIR CONDITIONING AND REFRIGERATION

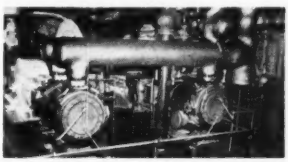
How Cold Do You Want It?

From the complete line of Worthington equipment—all *manufactured*, not just assembled by Worthington—you can get the maximum variety of refrigerating equipment.

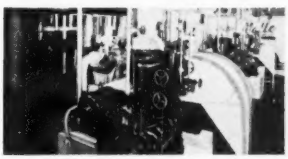
Typical of this variety are the following:

John Morrell & Co. plant at Topeka, Kansas

At John Morrell & Co.'s Topeka plant, a Worthington Uniflo horizontal ammonia compressor is completing its tenth year helping to chill and freeze meat products at temperatures ranging from 0 to 60 degrees. This steam-driven compressor was installed in 1940, and is still operating efficiently on around-the-clock service.



Worthington steam-driven ammonia compressor in John Morrell Plant



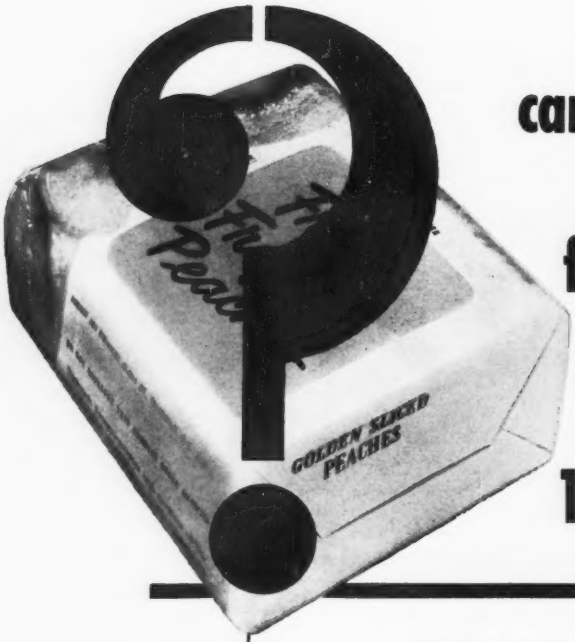
Worthington refrigeration equipment operated by Coastal Dairy Products

Ice cream is the job handled by Worthington compressors at Coastal Dairy Products, Wilson, N. C. Three vertical ammonia compressors and one ammonia booster compressor are used to pre-cool the mix to 40 F, freeze at about 0 F, and then harden at minus 20 F.

INVESTIGATE

MORE WORTH WITH WORTHINGTON

Consult Classified Telephone Directory for nearest Worthington distributor. Worthington Pump and Machinery Corporation, Air Conditioning and Refrigeration Division, Harrison, N. J., specialists in air conditioning and refrigeration for more than 50 years.



can Your frozen fruit pack meet new 1951 standards?

Tentative frozen fruit standards already issued — which may soon become mandatory — raise quality standards to new highs. As a result, the following developments merit your careful attention:

Ascorbic and Citric Acids have been recognized as efficient antioxidants and enzymatic retardants for flavor and color saving. Citric Acid has been recognized for neutralizing caustic without an after-wash.

Pfizer offers Ascorbic Acid and standard Ascorbic-Citric Mixtures — and for bulk users special formulations can be custom-mixed. With years of experience in the food field, Pfizer has amassed a large and valuable amount of data of special interest to the frozen packer. For complete technical details, samples and prices, just drop us a line today.

PFIZER QUALITY®

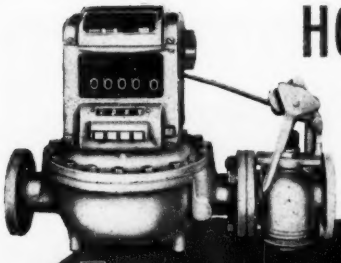
PFIZER

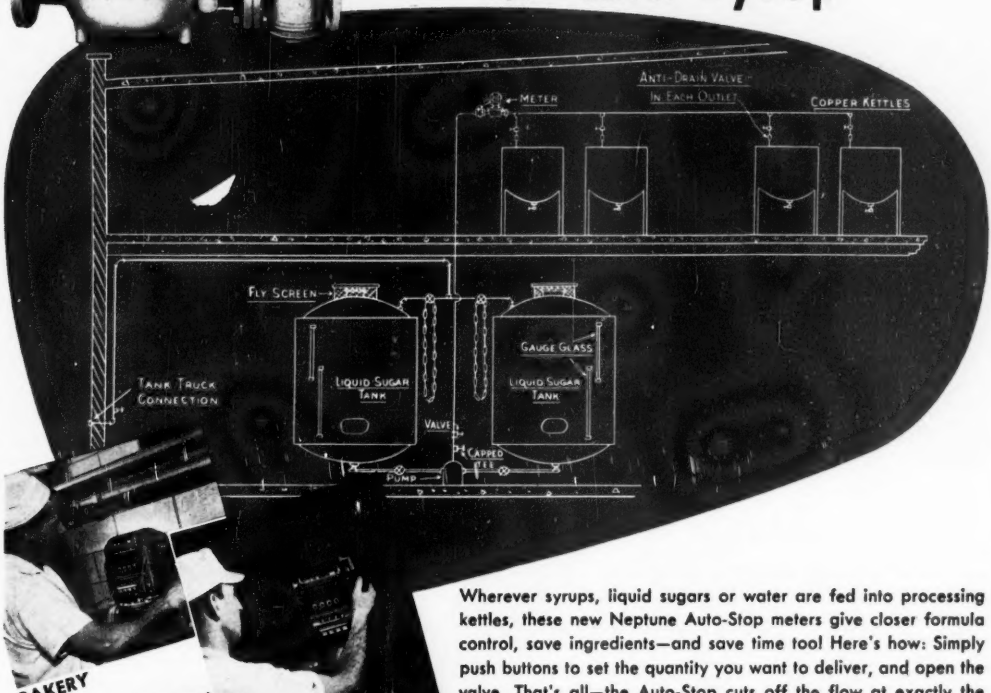
ASCORBIC ACID and ascorbic-citric mixtures

For the Frozen Food Industry — Ascorbic Acid, Ascorbic-Citric Mixtures • **For the Dairy Industry** — Vitamin A Acetate and Palmitate, Sodium Citrate, and Ascorbic Acid **For the Milling Industry** — Bi-Cap® Enrichment Concentrates • **For the Baking Industry** — Enrichment Wafers, Gluconic and Fumaric Acid • **For the Feed Industry** — Bi-Con® Terramycin and Vitamin B_{12} Supplements, Iodides.

Chas. Pfizer & Co., Inc., 630 Flushing Avenue, Brooklyn 6, N. Y.; 425 North Michigan Avenue, Chicago 11, Ill.; 605 Third Street, San Francisco 7, Calif.

HOW NEPTUNE METERS SAVE in Handling Liquid Sugar or Corn Syrup





BAKERY

CANNING

CANDY

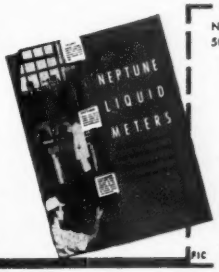
Wherever syrups, liquid sugars or water are fed into processing kettles, these new Neptune Auto-Stop meters give closer formula control, save ingredients—and save time too! Here's how: Simply push buttons to set the quantity you want to deliver, and open the valve. That's all—the Auto-Stop cuts off the flow at exactly the right quantity. Every batch perfect—you eliminate spoilage and spillage—save time and labor formerly spent watching gauge sticks, filling batch tanks or handling bags or buckets. These attractive, cream-colored meters are more sanitary, too—the liquids stay inside the pipes. Their easy-to-read registers include a totalizer to give you accurate, quick, cost-accounting figures. Other Neptune meters available for easy or tough jobs with 100 different liquids. Famous for sustained accuracy and low maintenance. For quick recommendations, just phone the nearest Neptune office below, or use the handy coupon.

NEPTUNE *liquid* METERS

50 WEST 50th STREET, NEW YORK 20, N. Y.

Branch Offices

ATLANTA • BOSTON • CHICAGO • DALLAS • DENVER
LOS ANGELES • LOUISVILLE • No. KANSAS CITY, MO.
PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO
CANADIAN FACTORY: LONG BRANCH, ONTARIO



NEPTUNE METER COMPANY
50 W. 50th St., N. Y. C. 20:

☐ *Rush Bulletin 573-4*

We're interested in metering:

☐ *Liquid Sugar and Syrups*
☐ *Water*

Name.....

Company.....

Address.....

it's New! it's Different!

it's the strongest pipe wrench in the world!

–the revolutionary Walworth improved Walco®

Yes, this is it . . . the NEW Walworth *Improved* Walco pipe wrench–with every part scientifically designed and tested by engineers for strength, safety and ease of operation. Its instant bite, and accurately determined center of gravity, combine with its inherent strength and minimum of weight to make it the fastest-working, easiest-handling, best balanced, heavy-duty pipe wrench available today . . . a wrench specially designed to minimize operator fatigue.

All parts are made of forged steel. The housing and handle are projection welded–a structural weld–to form an integral unit. Both jaws are carefully machined, and all parts are heat-treated to give extra toughness, uniformity, and strength. Every Improved Walco far exceeds the requirements for Federal Specification GGG-W-651a for Type II Heavy Duty Adjustable Pipe Wrenches.

A flexible, double-acting, easily replaceable spring–an exclusive patented Improved Walco feature–gives the wrench fast, positive ratcheting action!

Ask your Walworth distributor about the new, Improved Walco today! Heft the new, Improved Walco . . . feel its perfect balance–every part is guaranteed by the Walworth Company, doing business since 1842.

Check these outstanding features

LIGHTER: Housing and Handle are projection welded to form one integral unit.

CORRECT BALANCE: Accurate, the correct location of the center of gravity determined by test.

STRONGER: Heat treated to eliminate brittleness . . . cracking.

FAST ACTING: Scientifically designed spring action insures positive ratcheting action . . . quick bite.

CALIBRATED PIPE SCALE: Built-in scale permits speedy adjustment to pipe size.

RENEWABLE PARTS: All parts are readily obtainable, and easily replaced without special tools; thus prolonging service life indefinitely.

RUST RESISTANT FINISH: Entire wrench is rust resistant — Nut and Jaws have a special electroplated zinc coating.

WALWORTH

valves...fittings...pipe wrenches

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

SEABROOK FARMS PHOTO BY TAUBERT

Thanks to Thermoid Belting . . .
Nimble Fingers Prepare Vegetables *Faster* for Quick-Freeze

The picture above is a picture of profit . . . *in produce handling.* Long life, continuous-flow Thermoid Belting keeps the line moving . . . during busy seasons when shut-downs can knock-down profits.

Thermoid Belting has met the test of reliable, full-shift service in many food packaging plants as well as thousands of factories and warehouses throughout the country. Continuing Thermoid research and product development have kept pace with increasingly stiff materials handling requirements. Thermoid distributors and field representatives—working day-by-day with materials handling problems similar to yours—know how to select the right belt for your application.

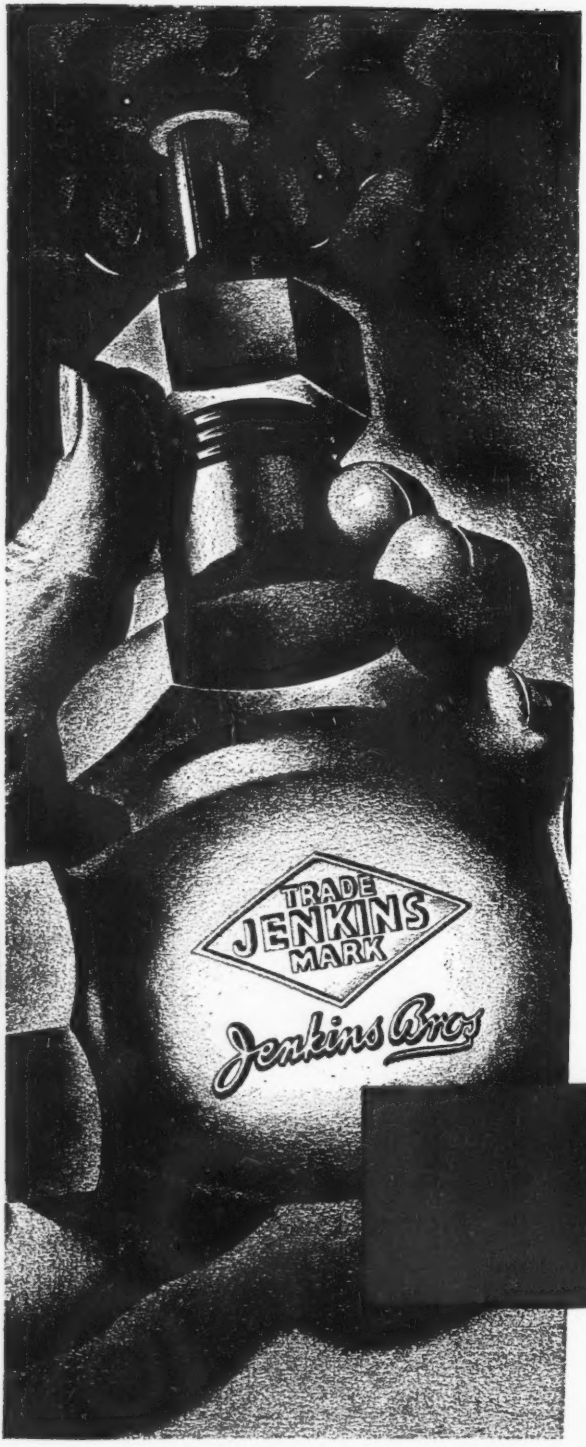
Don't let a belting problem slow down your line . . . don't let a belt that wears out prematurely wear down your profits. Call your Thermoid distributor. Together with the Thermoid field representative, he can help you get greater economy, longer service life and greater production for your belting dollar.

It will pay you to *Specify* Thermoid

Thermoid Quality Products: Transmission Belting • F.H.P. and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Molded Products • Industrial Brake Linings and Friction Materials.

Thermoid Company

Main Offices and Factory • Trenton, N. J., U. S. A.
Western Offices and Factory • Nephi, Utah, U. S. A.
Industrial Rubber Products • Friction Materials • Oil Field Products



"We will sign it with our name"

Few things in life are as precious to a man as his name. He bestows it with pride on his heirs. He does not sign it lightly. To the man of integrity, his signature is not so much a means of identification as an evidence of good faith.

When the Jenkins brothers were satisfied they had made the best valve money could buy, they *signed* it with their name. Today, as for over three quarters of a century, that signature — forming, with the famous Diamond, the Jenkins trade mark — is more than a symbol of the maker's pride in his craftsmanship. It is the mark of a friend you can trust.

Jenkins Bros., 100 Park Avenue, New York 17. Jenkins Bros., Ltd., Montreal.

TO THE MANUFACTURERS OF
FOOD PROCESSING EQUIPMENT . . .

What YOU can do to make the supply of Stainless Steel go further

1

Tell your supplier the exact purpose the Stainless Steel is intended for and how you plan to fabricate it. Then you will get the *right* steel for the job.

2

Minimize your scrap losses by ordering the size that will cut to best advantage.

3

Indicate, if possible, acceptable alternates in composition, gage, size and finish . . . it may speed up deliveries to you.

THESE SUGGESTIONS for conserving Stainless Steel are made to assist you during the difficult period we face today. The withdrawal of large tonnages of Stainless Steel — vital for rearmament — make it imperative that supplies of Stainless available for non-military use be made to go as far as possible. This can't be done without the close cooperation of everyone concerned — the steel producer, the steel supplier, and you, the steel user.

AMERICAN STEEL & WIRE COMPANY, CLEVELAND · COLUMBIA STEEL COMPANY, SAN FRANCISCO
NATIONAL TUBE COMPANY, PITTSBURGH · TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM · UNITED STATES STEEL COMPANY, PITTSBURGH
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

1-309-A

UNITED STATES STEEL

SYLVANIA® CELLOPHANE

— gives your packaging the jump on competition!

Visit Our Booth at the A.M.A. National Packaging Exposition, Public Auditorium, Atlantic City, April 17-20, 1951.

These are some of the properties that can help your products win sales:

1. **MOISTURE PROTECTION**
2. **Sales appeal**
3. **High speed application**
4. **Transparency**
5. **Low Cost**

Sales-winning windowbox cereal package consists of inner bag of Sylvania Cellophane MS-3. Overwrap is MS-1. Both are in the 300 gauge.

SYLVANIA® CELLOPHANE

Sylvania is always ready to help you solve your packaging problems. Discuss them with your Sylvania representative or write us mentioning the specific application in which you are interested. Address: Market Development, Dept. F-2.

SYLVANIA DIVISION AMERICAN VISCOSE CORPORATION

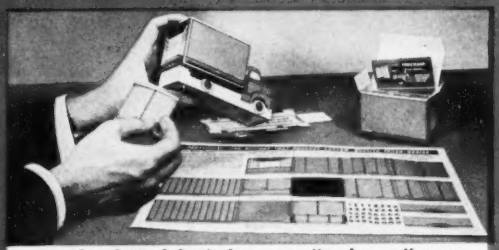
Manufacturers of cellophane and other cellulose products since 1929

General Sales Office: 1617 Pennsylvania Blvd., Philadelphia 3, Pa.

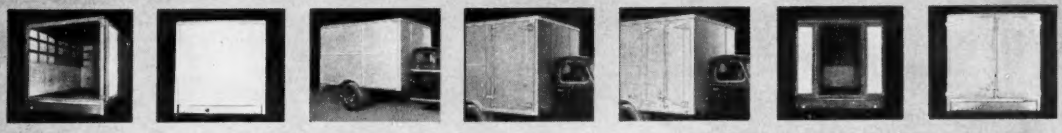
Plant: Fredericksburg, Va.

FRUEHAUF "Unit-Built" TRUCK BODIES

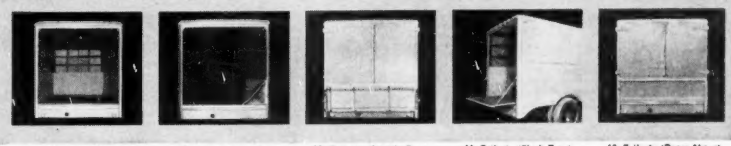
are custom-fitted to your job... with over 500 body options!



Fruehauf Model Kit lets you "make up" your body—with all options—in miniature.



1. Open Top 2. Solid Rear End 3. Solid Sides 4. Single Side Door 5. Double Side Door 6. Narrow Double Rear Doors 7. Full Width Rear Doors



8. No Rear Door 9. Express Gate Rear 10. Tailgate (Outside Type) 11. Tailgate (Flush Type) 12. Tailgate (Doors Above)

Count all the advantages of buying a Fruehauf before you consider any other Truck Body: 1. Over 500 options. 2. All steel, "Unit-Built" construction. 3. Straight frame or wheelhousing . . . all popular lengths. 4. Fast assembling, mounting and painting service at 80 Branches coast-to-coast. 5. Custom-built quality at production-line prices.

FRUEHAUF Truck Bodies

"ENGINEERED TRANSPORTATION"

FREE CATALOG AND MODEL KIT!

See your local Truck Dealer or Fruehauf man, or write

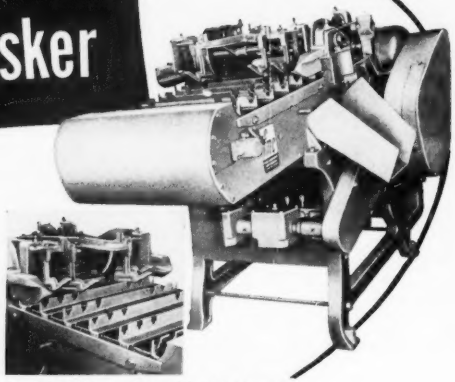
FRUEHAUF TRAILER COMPANY

BODY DIVISION, DETROIT 32, MICH.

Top performance that means faster, cleaner husking

the fmc Corn Husker

Discharge End View—Four semi-hard rubber rolls, each with three interchangeable sections, provide efficient, economical husking. Spiral grooves improve the flow, strip corn completely free of all husk.



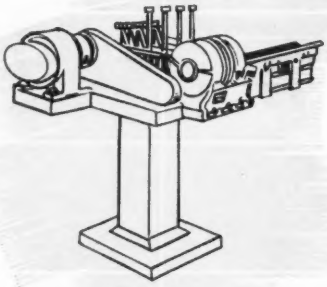
Feed End View—View of feed table and ear handling mechanism shows adjustable, self-cleaning husk rippers; also, adjustable presser arm which insures uniform, square cutting of butts before husking.

Employing every up-to-date husking principle, the FMC Double Husker has become indispensable for fast, efficient flow-line preparation and processing of corn. As ears of corn move along the feed table, husks are gently loosened and the butts are cleanly severed. Ears are then dropped to special spiral-grooved husking rolls, which completely strip the husks, leaving the corn clean with kernels intact. Vibrating husking-roll partitions keep ears moving down rolls with no danger of clogging.

Throughout the entire husking operation, corn of any size or tenderness is handled firmly but gently. Big savings in time, inspection, trimming and rehusking *reduce costs and increase profits.*

Write for full information on this and other equipment in the complete FMC "Stalk to Storage" corn preparation and processing line. Immediate shipment of FMC Huskers and Cutters.

FMC UNIVERSAL CORN CUTTER



This flexible machine produces a close, clean cut for maximum yield. The only machine that cuts both whole grain and cream style corn.

First in Diversified Food Equipment

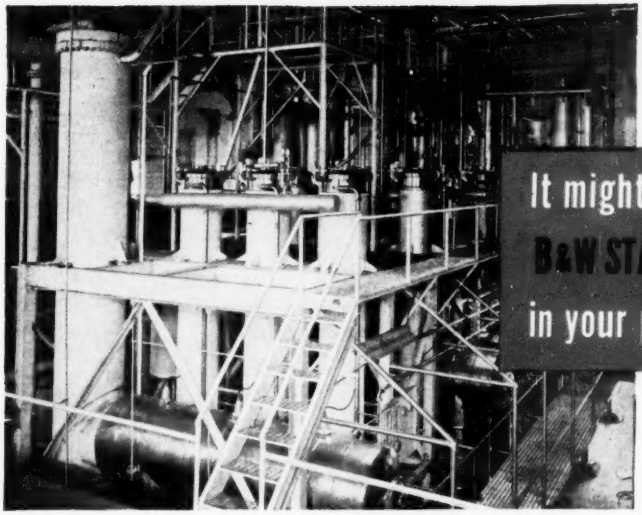
fmc FOOD MACHINERY AND CHEMICAL CORPORATION

FOOD MACHINERY AND CHEMICAL CORPORATION

Canning Machinery Divisions

General Sales Offices:

EASTERN: HOOPESTON, ILLINOIS **WESTERN:** SAN JOSE 5, CALIFORNIA



It might pay you to SPECIFY B&W STAINLESS CROLOY TUBING in your processing equipment

Processing room, Lake Wales Plant of Florida Citrus Canners' Cooperative. The revolutionary new low temperature evaporator is tubed with B&W Stainless Croloys.

Ask your B&W Tube Representative... He can help you

B&W STAINLESS CROLOY TUBING
Now, More than Ever, Your Best Buy

TYPES—Seamless and Welded.

GRADES—Complete range of austenitic and ferritic stainless steels.

SIZES—Up to 8⅝" OD in a wide range of wall thicknesses. Pipe sizes through 8" nominal diameter in all schedules.

SURFACE FINISHES—White pickled, as welded, polished.

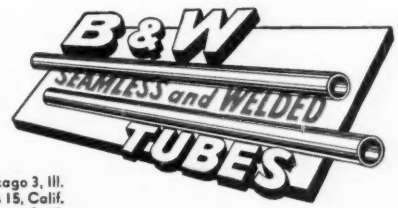
SHAPES—Round, square, rectangular, oval, and special shapes.

FABRICATION—Upsetting, expanding, bending, safe ending, and machining.

END USE DESCRIPTION—General Corrosion Resistance Service, Pressure Piping, Pressure Tubing, Sanitary Tubing, Mechanical Tubing.

NOTE: In addition to Seamless and Welded Stainless Tubing, B&W manufactures seamless and welded carbon steel tubing and intermediate alloy tubing for all mechanical and pressure applications.

He is factory-trained in cost-saving "tube-technics" ... sells *only* tubes ... knows why B&W Stainless Croloy Tubing is preferred by so many manufacturers and users of food and chemical processing equipment ... and can help you uncover economies in the selection, ordering, and application for your services from the broad scope of B&W Stainless Croloy Tubular Products.



THE BABCOCK & WILCOX TUBE COMPANY
***General Offices:* Beaver Falls, Pa.**
***Plants:* Alliance, Ohio, and Beaver Falls, Pa.**

Sales Offices: Alliance, Ohio • Beaver Falls, Pa. • Boston 16, Mass. • Chicago 3, Ill. Cleveland 14, Ohio • Detroit 26, Mich. • Houston 2, Texas • Los Angeles 15, Calif. New York 16, N. Y. • Philadelphia 2, Pa. • St. Louis 1, Mo. • San Francisco 3, Calif. Syracuse 2, N. Y. • Toronto, Ontario • Tulsa 3, Okla.

TA-1580-S

To Safeguard Your Bounteous Market Basket—

GAS WORKS ENDLESSLY PROCESSING AND PRESERVING

BUSHELS, TONS, BOXES—America's fish and fowl, livestock, crops, and other food products are measured in multi-millions as they pour annually into the world's greatest market basket. But this national wealth is more valuable because it can be distributed, served, and preserved. In the food processing and preserving industries you'll find Gas in one of its most important economic roles.

FOR MEATS, FISH, FOWL the various heat-processing functions are performed by Gas. Smoking, rendering, baking, steaming, roasting—these are just a few of the vital operations in the packing industry where the productive flames of Gas are applied to the preparation of food for future use.

TO CONVERT AND PRESERVE GRAINS, heat is applied in drying, toasting, exploding, dehydrating, and other operations to convert crops for feeding humans or livestock. Here, again, you'll find uncounted heat-processing applications where clean, accurately controlled Gas has long been the accepted fuel.

FROM ORCHARDS, VINEYARDS, GROVES come the health-giving delights which help fill the bounteous market basket. For drying, distilling, batch-cooking, dehydrating, rendering, and extracting, the role of Gas is continually expanding because this versatile fuel can be applied to production-line processes without elaborate equipment changes.

IF YOU PROCESS FOODS, Gas is ready to serve you efficiently. Wherever you have a heat-processing problem in food preparation or preservation or in any other type of industry—your Gas Company Representative will show you how to do it best—with Gas.

AMERICAN GAS ASSOCIATION

420 LEXINGTON AVENUE, NEW YORK 17, NEW YORK

MORE AND MORE...
THE TREND IS TO GAS
FOR ALL HEAT PROCESSING OF FOODS

power modernization

lowers production costs...

with control of speed

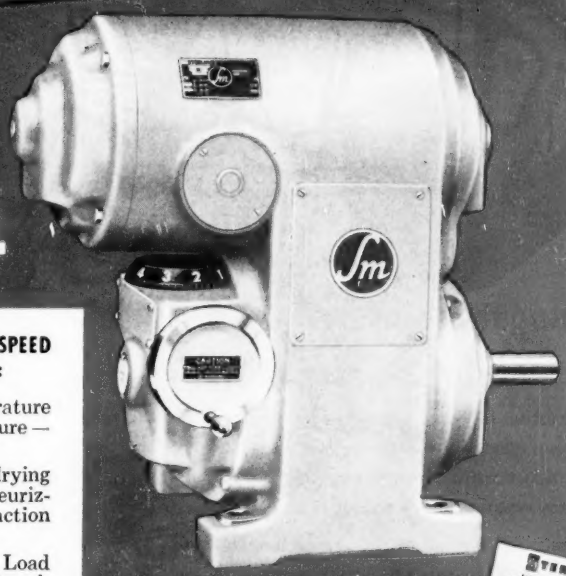
A manufacturer* of food processing machinery states,

"Speed-Trol made possible the design of a new de-watering press which resulted in:

- **26% greater moisture extraction . . . plus corresponding savings in the reduction process . . . plus perfect control of moisture content."**

(Name upon request)

STERLING SPEED-TROL



...GIVES YOU VARIABLE SPEED CONTROL NECESSARY FOR:

PROCESS CONTROL OF: Temperature — viscosity — level — pressure — flow — etc.

TIME CONTROL OF: Baking — drying — heating — cooking — pasteurizing — soaking — chemical action — etc.

EQUIPMENT ADAPTATION TO: Load variation — sequence synchronization. Size — tension — hardness or shape of materials to be processed — machined — conveyed — blended — mixed — etc.

VARIATIONS IN: Quality — quantity — operators' abilities — etc.

Ask for your copy of pictorial bulletin No. C-60, showing Sterling Electric Power Drives Turning The Wheels of Industry.

STERLING ELECTRIC MOTORS

Plants: New York 51, N. Y.; Los Angeles 22, California; Hamilton, Canada; Santiago, Chile.

Offices and distributors in all principal cities.

Some things give solid satisfaction

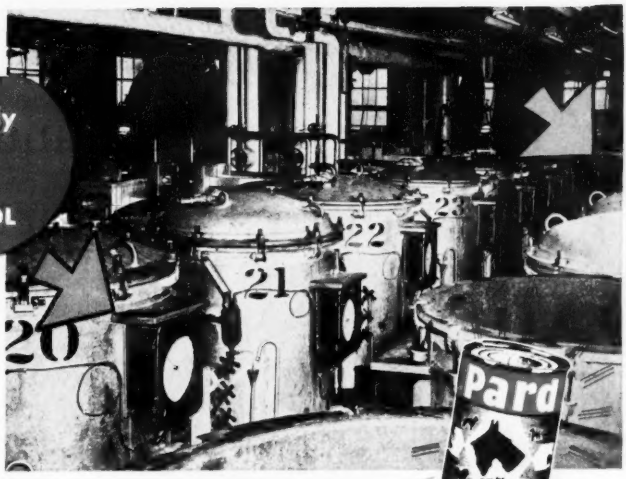
You've waited for this—the day you and your son would reach across the years and share a boy's pleasures together! Something of the same satisfaction is yours when the success of your product justifies all the effort you've put into it.

Of course, you've used sugar. To quality manufacturing, sugar brings a uniformly high standard of purity. Sugar has 10 to 50% more sweetening power. Sugar alone brings out the best natural flavors of higher-priced ingredients.

Set your signals for a clear track —always use sugar. It pays off in solid satisfaction.

SUGAR INFORMATION INC.
NEW YORK 5 NEW YORK

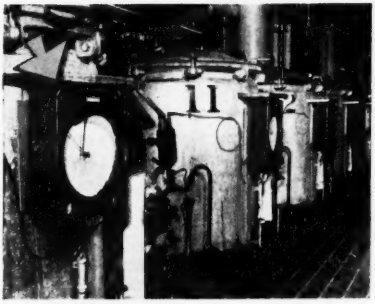
Cooking of Swift's PARD is automatically regulated by POWERS TEMPERATURE CONTROL



SWIFT & CO.

guards PARD quality with

POWERS

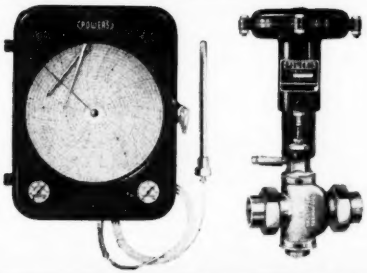


Temperature Recording Regulators on Cooking Retorts

One of the important steps insuring PARD'S uniformly high nutrient content, taste, color and odor is accurate temperature control of cooking operations. Powers instruments are used here on cooking retorts in which Pard is processed.

Other processes and operations in Swift & Co. plants regulated by Powers controls are:

Large Water Heaters • Booster Heaters for Sterilizing • Hog Scalding Vats and De-hairing Machines • Cooking Vats, Kettles and Sausage Steaming Cabinets • Smoke Houses • Drying, Curing and Chilling Rooms • Slicing and Packaging Rooms — and Many Processes in By-Product Plants.



If you have a problem of temperature or humidity control, contact your nearest POWERS office. There's no obligation. With almost 60 years of experience and a wide variety of pneumatic and self-operated controls we may be able to help you select the best equipment for your requirements.

(SCR)

THE POWERS REGULATOR CO.

Over 55 Years of Pneumatic Temperature Control • Offices in Over 50 Cities • See Your Phone Book

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★ ★ ★ *Ask Mrs. Homemaker—she'll tell you* ★ ★ ★

"I choose enriched and fortified foods for my family"

AMERICAN housewives enthusiastically endorse the Food Industry's program of enrichment and fortification. More and more, they select *enriched* and *fortified* foods for their family tables.

And their judgment has again been proved correct by the results of the large-scale Newfoundland Nutrition Surveys. These studies reaffirmed that enriched and fortified foods promote *healthier* bodies, sharply reduced infant mortality, lower tuberculosis and over-all death rates — improvement in both the quantity and quality of life.

When you enrich or fortify with Merck Vitamin Products you *know* that the faith of millions of American women is fully protected. Merck Vitamin Products come from the same organization that pioneered in the research and large-scale production of thiamine, riboflavin, niacin, vitamin C, and other important nutrients. And now, the most recent contribution is thiamine mononitrate, a form of thiamine that has the advantage of greater stability in certain food applications.

With the enrichment program, as well as general food fortification, steadily growing in stature, Merck continues to lead in every distinct, forward step.

Merck Vitamin Products for Enrichment and Fortification

VITAMIN B_1
Thiamine Hydrochloride
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RIBOFLAVIN
(Vitamin B_2)

NIACIN
(Nicotinic Acid)

ASCORBIC ACID
(Vitamin C)

Merck Enrichment Ingredients for Millers, Bakers, Cereal and Macaroni Manufacturers • Merck Vitamin Mixtures for Flour Enrichment • Merck Bread-Enrichment Wafers • Merck Vitamin Mixtures for Corn-Products Enrichment • Merck Vitamin Mixtures and Wafers for Macaroni Enrichment.

Merck Knows Vitamins

MERCK

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Merck Vitamin Products for Enrichment and Fortification

ANNOUNCING!

NEW DODGE "Job-Rated" TRUCKS

The trucks that do the most for you!

NEW Greater Power! Eight engines—with horsepower increases as high as 20%. You'll enjoy the *right power* for your job! *With all their extra value, Dodge "Job-Rated" Trucks are priced with the lowest!*

NEW Easier Handling! Now, even sharper turning! More comfortable steering angle and easier-operating new worm-and-roller steering gears! You also get such proved features as cross-steering, wide front tread, short wheelbase.

NEW Interiors! Striking new, massive appearance—inside and out! Lower hood line for better visibility. Attractive two-tone cab interiors. New seat comfort. New clear-vision instrument panel. New seat comfort.

NEW Extra Quiet Brakes! Another Dodge "first"! Molded, tapered Cyclebond brake lining. Practically eliminates squeal and grab. Extra-smooth, positive action. Extra-long life. Standard on trucks 1½-ton and up, except air brake models.

MORE THAN 50 BRAND-NEW IMPROVEMENTS . . . INCLUDING

- NEW! SMOOTHER RIDE
- NEW! EASIER LOADING
- NEW! EASIER BAD-WEATHER STARTING
- NEW! GREATER ELECTRICAL CAPACITY
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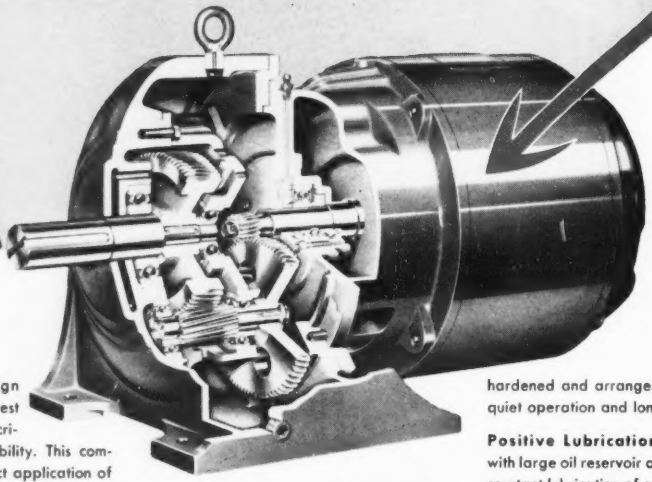
- NEW! BETTER VISIBILITY IN BAD WEATHER
- NEW! MORE EFFICIENT FUEL PUMP

ANOTHER DODGE EXCLUSIVE! gyrol fluid drive now available on ½-, ¾-, and 1-ton models.

See the NEW **DODGE "Job-Rated" TRUCKS** on display at your dealer's **SATURDAY, FEBRUARY 10th**

For SLOW SPEED Output with HIGH SPEED Motor Efficiency

PHILADELPHIA GEARMOTOR



Compact Design—Design conserves space to greatest extent possible without sacrifice of strength or accessibility. This compactness simplifies the direct application of electric drive to individual machines.

Balanced, Integrated Dynamics—For Strength—Design of gear unit in the higher ratios lends triangular stability based on Balanced, Integrated Dynamics. High grade grey iron cast frame gives added strength and shock resistance.

Precision-Built Motors—Precision-Built A-c and D-c Motors provide dependable power for all models—fit perfectly with gear unit.

Simplified Assembly—Motor and gear unit, each self-contained, are readily separated; gears in multi-reduction units may be inspected without uncoupling from driven machine.

Quiet, Long-Lived Gears—Helical gears are alloy steel—precision-machined, wear-hardened and arranged in simple train for quiet operation and long life.

Positive Lubrication—Splash system with large oil reservoir assures thorough and constant lubrication of all parts of gear unit. Leak-proof housing. Motor, greased independently, has double-shielded ball bearing design.

Unlimited Adaptability—Available in single, double and triple reductions to provide a wide range of speeds with motor ratings from 1 to 60 hp. NEMA "D" type flange mounting permits use of any type enclosure in A-c or D-c motors.

Send for new 42 page illustrated catalog GM-48, containing full information and data necessary for ordering, and please use your Business Letterhead when requesting same.

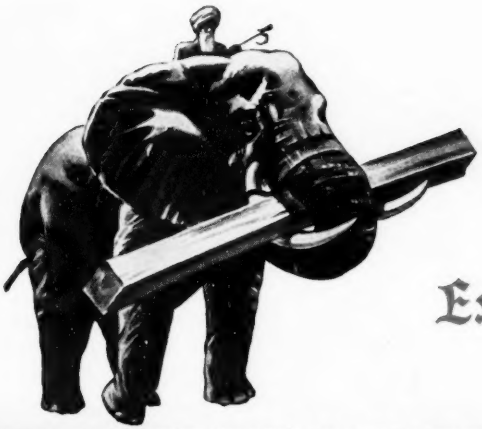
Philadelphia Gear Works, INC.

ERIE AVE. AND G ST., PHILADELPHIA 34, PA.

NEW YORK • PITTSBURGH • CHICAGO • HOUSTON

IN CANADA: WILLIAM AND J. G. GREEY LIMITED, TORONTO

Industrial Gears and Speed Reducers
LimiTorque Valve Controls



IT COSTS $5.50 A DAY TO FEED AN ELEPHANT... ONLY 34 CENTS TO "FEED" AN Exide-Ironclad BATTERY

Thirty-four cents a day pays the full power cost of an Exide-Ironclad battery-powered industrial truck. Lifting, hauling and tiering all day long, it handles more tonnage than a herd of husky tuskers could move in equal time.

But low power cost is only part of the Exide story. In addition, Exide-Ironclad Batteries bring you these important benefits.

INSTANT SURGE OF POWER, plus finger-tip control, split-second handling, easy maneuvering, accurate spotting.
ROUND-THE-CLOCK PERFORMANCE—no mechanical troubles, no unscheduled down time.
UNIFORM SPEED straight through to end of shift.
LOW MAINTENANCE COSTS—seldom more than 15 cents per shift.
EXCEPTIONALLY LONG LIFE—proved on more than 100,000 heavy-duty jobs.
INHERENT SAFETY—no vibration to jar goods in transit, less worker fatigue and accident hazards.

There are Exide-Ironclad Batteries for every size and make of battery electric truck.

Write for more facts and FREE copy of Exide-Ironclad Topics. It contains latest developments in materials handling . . . shows actual case histories.

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 32
Exide Batteries of Canada, Limited, Toronto
"Exide-Ironclad" *Reg. Trade-mark U. S. Pat. Off.*

1888 . . . DEPENDABLE BATTERIES FOR 63 YEARS . . . 1951

hit the JACKPOT...

Those plants that are concentrating, or clarifying fruit and vegetable juices with the Sharples DV-2 controlled solids discharge centrifuge, are obtaining important advantages in both quality of product and economy of processing.

The DV-2 was developed specifically for the food industry, and is now in operation on over a dozen different food processing applications.

It will pay you to investigate the Sharples DV-2.

SHARPLES

THE SHARPLES CORPORATION

2300 Westmoreland Street, Philadelphia 40, Pa.

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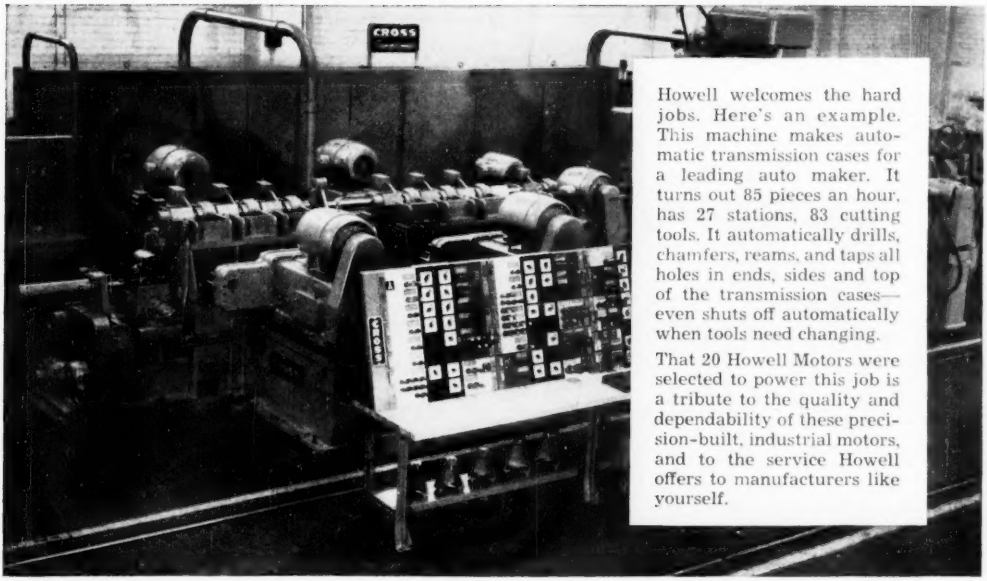
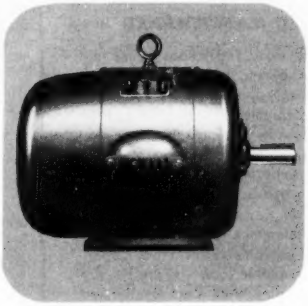


Howell welcomes the hard jobs. Here's an example. This machine makes automatic transmission cases for a leading auto maker. It turns out 85 pieces an hour, has 27 stations, 83 cutting tools. It automatically drills, chamfers, reams, and taps all holes in ends, sides and top of the transmission cases—even shuts off automatically when tools need changing.

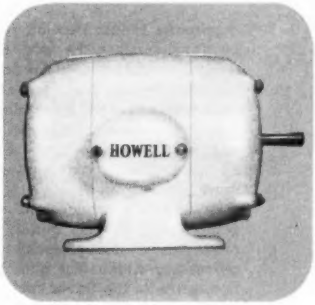
That 20 Howell Motors were selected to power this job is a tribute to the quality and dependability of these precision-built, industrial motors, and to the service Howell offers to manufacturers like yourself.

Solution for . . .
THE CASE OF AN AUTOMATIC TRANSMISSION



Howell Type K Motor. Offers constant performance in the presence of dirt, dust, fumes, and moisture. Sizes from 3 to 150 H.P. at 1800 R.P.M. Either vertical or horizontal mounting.

Howell makes specially designed motors—vertical, round body, flange and face mounting, built-in stator and rotor jobs, etc.—to meet a wide range of requirements.



Howell Sanitary Motors meet the most exacting standards of the dairy and food industries. They contain no pockets, cracks, or crevices. Available for vertical or horizontal mounting.

Read this if you need special motors

Howell offers a unique job-engineering service for special motor applications.

With it, you get: (1) cooperation of our engineering personnel; (2) prompt quotations on both standard and custom motors; and (3) the ability to accurately manufacture custom-designed motors within reasonable time.

We believe these services will save you, as a purchaser of electric motors, valuable time and money.

May we apply our facilities and engineering ability to your problem?

HOWELL MOTORS

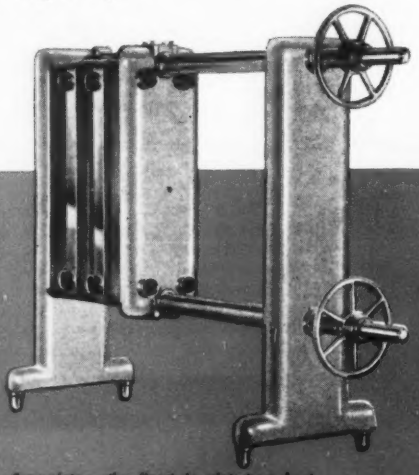
HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.

Precision-built Industrial Motors Since 1915

HOWELL Red Band MOTORS

SAVE THROUGH CONTINUOUS

PASTEURIZING
REGENERATING
HEATING
COOLING
with
Superplate



Superplate — the finest in plate-type heat exchangers. Available in stainless steel or painted finish. A size for every plant.

the SANITARY PLATE-TYPE HEAT EXCHANGER

Superplate is fast becoming a favorite plate-type heat exchanger in the food industry because it offers many savings over the less efficient batch-type operations of the past. For example, the exclusive knob-type stainless steel plates split the product into a thin stream for more intimate heat contact and develop the turbulent flow that speeds heat exchange . . . saving on fuel, steam, water and power costs.

And while operating and maintenance costs are going down, product quality is going up. Superplate has a totally enclosed, stainless sanitary processing circuit that guards against contamination, protects the flavor and delicate properties of fruit juices, oils, beverages, soups, syrups, milk and other liquid foods.

Ask your Cherry-Burrell representative about the many savings possible in your plant through continuous processing with Superplate. Also, be sure to ask about Superplate flexibility which allows easy expansion . . . simple, low-cost conversion to greater capacity when needed.

For a finer product — at lower cost — use the finest in plate-type equipment . . . Cherry-Burrell's Superplate.

SAVE THROUGH PLANNED MAINTENANCE

With more and more restrictions being imposed on material and manpower, it is becoming increasingly apparent that a thorough, well-planned equipment maintenance program is important in every plant. All equipment — even such fine, high-production machinery as Superplate — must be carefully tended to assure maximum output per man-hour, day in, day out. Bulletins describing latest maintenance procedures on all Cherry-Burrell equipment, including Superplate, will be available soon. Use the coupon to get your copies and start a planned maintenance program — now!

Mail this coupon today—

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Dept. 117, 427 West Randolph Street
Chicago 6, Illinois

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Trendmaker in a great industry

FEBRUARY, 1951

Food Industries

Where Food Processors Stand in Emergency

Like people in other industries, food processors are perplexed by uncertainties as to what's ahead. And many are a little frightened by problems which they see as vague shapes in the dim future.

There is some comfort in knowing that everyone is in the same boat. There is further comfort in appreciating the magnitude of the job that must be done in Washington before illuminating details can be developed.

The office of Defense Mobilization cannot perform miracles overnight. It cannot get the mobilization program rolling until it learns from the military how much of what is needed. And the military can't determine that until it knows what it must be prepared to do.

After the military program is definitely defined, requirements must be determined in respect to thousands of items. Next comes the terrific job of breaking these items down into component parts and calculating how much of what materials and production capacity are required.

Once this analysis is made, military requirements must be subtracted from national capacity to find what is available for civilians.

After the civilian share is finally determined, Washington agencies have to perform the almost superhuman feat of deciding what part of the pie goes to what industries and what size piece each segment of each industry should receive.

Up to now military requirements have been vague, and materials regulations necessarily have been largely of the general stop-gap variety. And we doubt if you can expect the detailed information you want of Washington for another two or three months.

But you know in general what to expect if you remember World War II. From that earlier experience you will realize that you must get ready to meet these problems:

1—A tight squeeze on profits, necessitating extensive application of more efficient methods. Keep in mind that most food processers can cut costs by modernizing materials handling methods; work simplification and incentive pay; greater use of automatic controls and automatic product transfer mechanisms on conveyors and machines; reducing waste and recovering valuable byproducts; better organized plant clean-up work and more power cleaning equipment; more efficient steam utilization; and continuous operations.

2—Shortages of packaging materials, which will require you to make substitutions and simplify your packages. Austerity packaging is coming, but if your container will get the product to the consumer in good condition it will serve its most important function.

3—Shortages of new equipment of all types. So you should have a good system of preventive maintenance, and don't spare the lubrication. You would be well advised to properly equip your maintenance shop.

4—Shortage of manpower, calling for labor saving, procurement plans and training schedules.

5—Special military requirements in respect to product and package. Here, at least, specific information is available from the QMC, though it is subject to change as improvements are developed.

6—Quantity of specific foods to be needed by the armed forces during the year, and how much to pack to meet combined military and civilian needs. Military requirements for canned fruits, vegetables and meats will be high, if recent buying in an indication. And before the canning season starts (maybe by the time you read this), fairly definite information will be available.

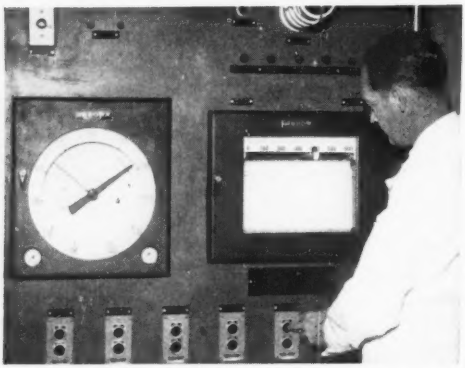
7—What the trend will be in civilian food consumption. High prices and taxes are likely to put a damper on further per capita increase and to cause some shift to cheaper foods until curtailment of consumer durable goods goes far enough to release additional food buying power.

While uncertainties will continue to plague food processors for some time, you can see the general pattern of what's ahead and lay tentative plans accordingly.

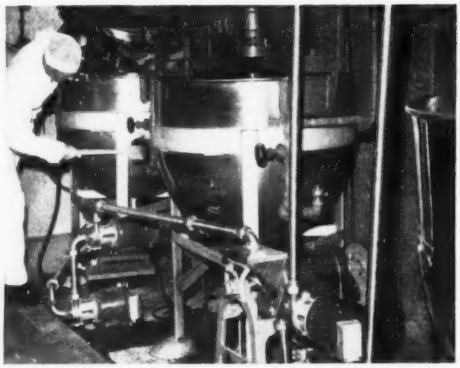
At least you're in an essential industry that will keep right on rolling along!

—F. K. LAWLER, *Editor*

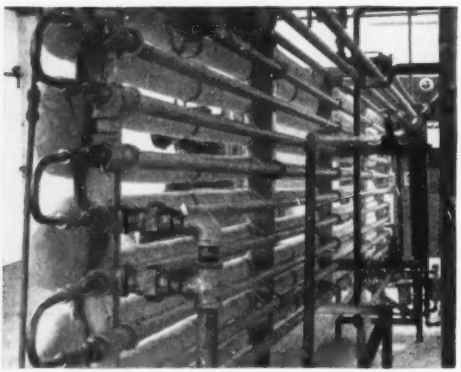
This Equipment Insures a Superior Product



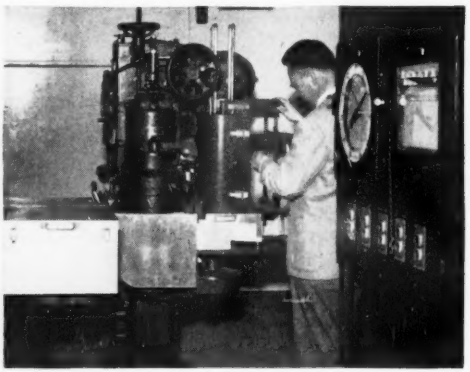
CONTROL PANEL. Soup's temperature is recorded and alarm warns of any drop below safe minimum.



STEAM-JACKETED KETTLES. Here, the ingredients are cooked, then are pumped to surge tank.



HEAT EXCHANGER. Soup is first raised to 285-290 F. After holding 8.8 sec., product is cooled to 90 F.



FILLING UNIT. It drops cool soup into previously sterilized cans, then seams on sterile lids.

Aseptic Canning In Action

Western processor employs method to can top-quality soup. Product is guarded by HTST technic. Operation is in new, specially engineered plant

C. R. HAVIGHORST
Associate Editor, "Food Industries"

When its quality frozen split-pea soup won state-wide consumer acceptance (p. 82, Sept. '49 FI), Andersen's Food Co. of Santa Barbara, Calif., was quick to see a promising opportunity: Profitable company expansion through national distribution of its popular soup.

But such a move with the frozen product posed limitations due to the low-temperature characteristics and demands of the cold-case specialty. And a decision to can it—in the conventional manner—also was open to question. For this would entail a process of longtime exposure to a high temperature and a consequent adverse effect on the product's flavor.

■ **So Andersen's decision went further: It would can the soup aseptically. And accordingly a new plant was constructed especially engineered for preparing split-pea soup by the Martin Aseptic Canning Process.**

Thus, this company became one of the first in the food field to adopt the aseptic technic.

Heat Treatment Accented

For assured aseptic performance, the new process provides heat treatment of a severity several times greater than that necessary for complete sterilization—yet without adversely affecting the quality of the finished canned product. Specifically, the sterilization value (F_o) is 16 to 18— approximately three times the accepted figure.

Utilized is a combination of the principles of high-temperature short-time sterilization and aseptic canning methods. The process differs from conventional canning in that the product is quickly sterilized and cooled before being sealed in cans. This is accomplished by pumping it, at high pressure, successively through the heating, holding, and cooling sections of a closed heat-exchange system.

Thus sterilized and cooled under pressure, the product flows continuously from the heat-exchanger to the aseptic canning machine, where it is filled and sealed in sterile containers without exposure to atmospheric contamination.

Canning procedure consists of these four separate operations, carried out simultaneously in a closed, interconnected system as a continuous process:

1. Sterilization of the split-pea soup under pressure at a high temperature by quickly heating, then holding and cooling it in a continuous flow through the heat-exchanger.

2. Sterilization of containers and covers with superheated steam.

3. Filling of the cold sterile product into sterile containers.

4. Aseptic sealing of the containers with sterile covers.

These operations are synchronized mechanically so that the raw product, containers, covers, and finished product move through the system without interruption.

All California specifications having been met, operations will be under the state cannery inspection regulations, in the same manner as other low acid canning processes.

Automatically Controlled

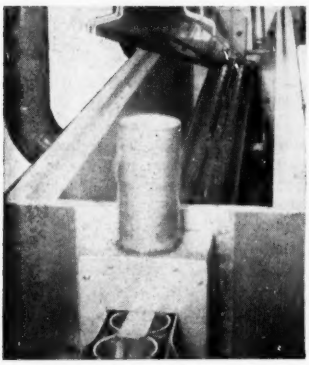
From the product surge-tank to the canned finished product (see photos), the process is automatically controlled from a main panel. One temperature recorder documents the product temperature; another, having an 8-point strip chart, records temperatures from eight various points in the system. The strip chart provides a "run record."

Both recorders are also equipped with a minimum-temperature alarm, which sounds if any temperatures at critical points in the system drop below their minimum values.

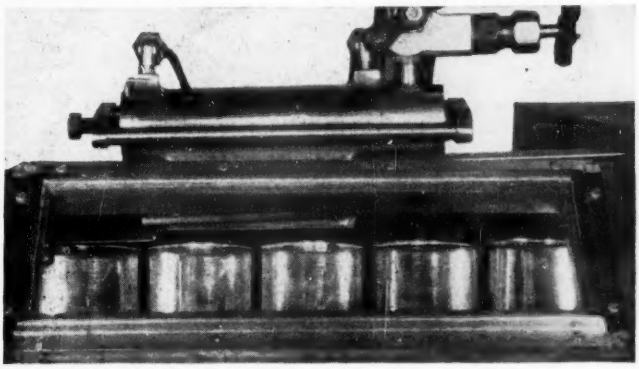
For the initial sterilization of the equipment, before operation each day, pipes are filled with water via a 3-way valve located just before the high-pressure pump. Then the entire system is brought up to specified temperatures and held for a minimum period of 10 min.

In the event of a production shutdown that necessitates opening and exposure to contamination of any part of the equipment, the parts thus

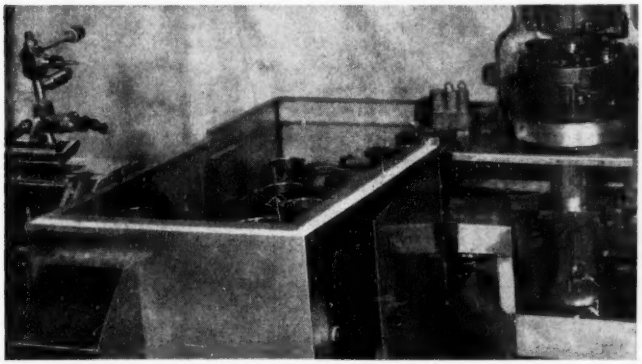
Details of Sterilizing, Filling, and Closing



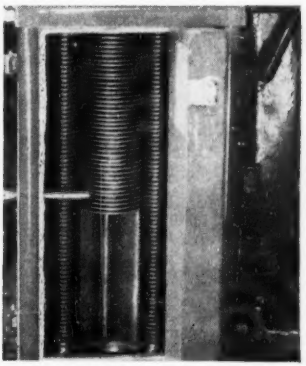
IN STERILIZER, superheated steam brings cans above 400 F.



CLOSEUP of valveless filler shows how cans travel in straight line under horizontal slit-type feed nozzle.



SEAMER fastens sterile lids on properly indexed cans as they move from filler (left). This equipment operates in an atmosphere of superheated steam at 400-600 deg. F., thus insuring freedom from contamination.



COVER sterilizer steams the downward-moving lids as they are spaced by worm screws.

exposed must be re-sterilized in the same manner as for initial sterilization. Following are the temperatures required in degrees F.

Product heat exchanger outlet	300
Can sterilizer steam	474
Can sterilizer duct	474
Cover sterilizer steam	500
Cover sterilizer chamber	330
Filling chamber	330
Closing machine	270
Filling nozzle:	
(a) Hot water at 300 F	270 (1st 5 min.)
(b) Superheated steam at 350 F	320 (2nd 5 min.)

The soup, comprised of green split-peas, carrots, celery, onions, spices, seasonings, M.S.G., and water, is cooked in four 100-gal. steam-jacketed kettles at the rate of 300 gal. an hour. It is then pumped from the kettles to a finisher, where any extraneous matter is removed, and next goes to the stainless steel surge-tank located on the mezzanine. By gravity, the product is fed to a positive displacement pump. Operated at a constant speed, this pump continuously delivers 5 gal. of soup per minute to the high-pressure pump that feeds the heat exchanger.

The soup, which at this point is at a temperature of 180 deg. F., is forced into the heat exchanger by the triple-piston pressure pump at 1,800 psi. In the sterilization section of this unit, which employs $\frac{3}{8}$ in. stainless steel insulated pipes, the soup is heated to 285-290 deg. F. in approximately 3.5 sec. For another 8.8 sec., it is kept at this temperature in the holding section, then it is cooled to 90 deg. F. in 14.0 sec.

A valve located at the can-filler assures sufficient back pressure in the lines to prevent boiling of the product in the sterilizing and holding sections of the heat exchanger.

After being cooled, the soup moves to the filling unit, where it goes into sterile cans, which then have sterile covers seamed on them.

The Can Sterilizer

—consists of a cable conveyor fitted in an insulated tunnel in which an atmosphere of superheated steam is maintained at a temperature of 400 to 600 deg. F. The steam, at atmospheric pressure is supplied by a gas-fired superheater located beneath the can sterilizer enclosure. It is circulated in and around the empty cans as they are conveyed through the tunnel.

The maximum temperature reached by the cans during their passage through the tunnel is approximately 425 deg. F.

Time of exposure of cans to this temperature is controlled by the speed of the conveyor, which is usually slow enough to insure an exposure considerably longer than the minimum required for complete sterilization.

Flue gasses, coming from the steam superheaters, flow around the enclosure and are vented to atmosphere. The heat from these gasses gives the tunnel an additional 20-30 deg. F. over the temperature provided by the superheated steam.

Filling and Closing Details

The cold, sterile product flowing continuously from the heat exchanger is filled into cans moving from the sterilizer to the seaming machine. Temperature of the product at this point ranges from 70 deg. F. to 100 deg. F., depending on the volume and temperature of the cooling water used. The cans are conveyed in a straight line directly beneath a slit-type continuous-filling nozzle. The filling aperture is $\frac{1}{8}$ in. wide and of sufficient length to accommodate the volume of flow of product being filled.

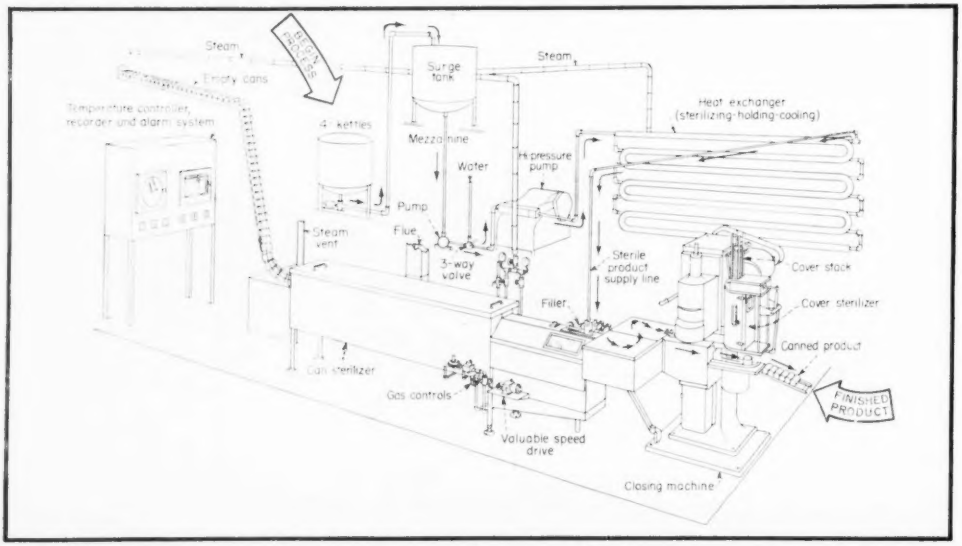
Spillage is almost completely eliminated because the cans are so close together that their flanges usually overlap. A temperature of 300 deg. F. is maintained within the filling enclosure.

Leaving the filler, cans are indexed so that they will enter the closing machine at proper intervals. In this unit, wherever filled cans are mechanically handled by the conventional closing machine there is a complete enclosure of stainless steel plates, and a temperature of 230 deg. F. is maintained inside.

Procedure With Covers

Can covers are stacked outside and above the cover sterilizer—an insulated vertical enclosure in which the covers are conveyed downward to the cover-feed of the closing machine. Two revolving screws peel the covers from the bottom of the stack and move them down in spaced relationship. They are sterilized by streams of superheated steam projected between them from a distributer plate (see photo). The covers are double-seamed on the cans, which are then conveyed to the cooling spray, labeling and casing department.

Planned capacity of the plant is 300 gal. of soup per hour.



FLOW DIAGRAM of aseptic canning process. Closed system insures high degree of safety. Automatic temperature recorders document operational data.

Clean Air Means Better Products

Brewers find that dust removal and air sterilization enhance flavor and extend life of beverages. Technics applicable to other food processing

QUALITY-MINDED brewers are now taking steps to eliminate dust from the air entering their wort cooling and fermenting rooms, and then following up by sterilizing this air to inactivate spores and other contaminating organisms. For it has been demonstrated that these air treatments greatly improve the flavor and keeping quality of beers and ales.

The air-sterilization also prevents contamination of yeast in ales, where top-fermentation is employed, thus eliminating the need for yeast replenishment over periods of time.

Advantages of clean air are recognized in the preparation of numerous foods. Hence, the technics described here are seen valuable for other food plant operators.

Wort Exposed at Two Steps

When it leaves the kettle, wort is biologically sterile. It passes through lines that have been carefully cleaned and sanitized, then flows over open-type coolers, where it is aerated as it is cooled. In most breweries this cooling-aeration takes place in a room supplied with "fresh" air taken from the outside of the building. This air contains many yeast and mold spores that are absorbed by the wort during the aeration step—spores that may multiply during fermentation to produce off-flavors in the brews, or to contaminate the yeast used for fermentation.

And when open fermenters are used, air-borne organisms can easily enter the beer or ale and produce undesirable flavors. Yeast in the brews thus can be rendered unfit for further use.

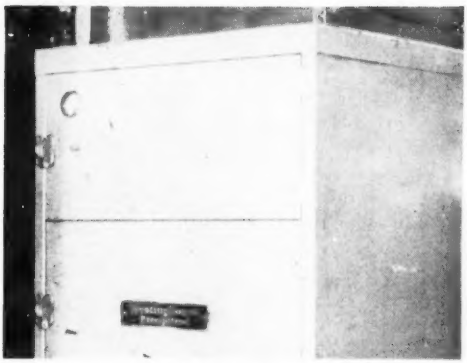
One method that breweries have found very satisfactory in preventing this contamination is a combination of electrical precipitation of dust particles from the air and exposure of the air to ultraviolet energy from germicidal lamps.

At the Pfeiffer Brewing Co., Detroit, all air entering the wort cooling room passes through a Precipitron, a unit that ionizes dust particles of 1/250,000 in. diameter and larger and collects them on a plate of opposite polarity. The air then travels through stainless steel ducts and is discharged between the leaves of the wort coolers. As the filtered air passes through these ducts it is exposed to rays from a bank of bactericidal ultraviolet lamps for inactivation of remaining organisms.

The mixture of air and steam that rises from the wort coolers is removed continuously by an exhaust fan. However, to prevent leakage of untreated air into the room when doors are opened, operation of the exhaust fan is regulated with that of the air-supplying blower in such a way that a slight pressure is maintained within the room at all times.

(*Turn to page* 222)

Ionizer stops dust

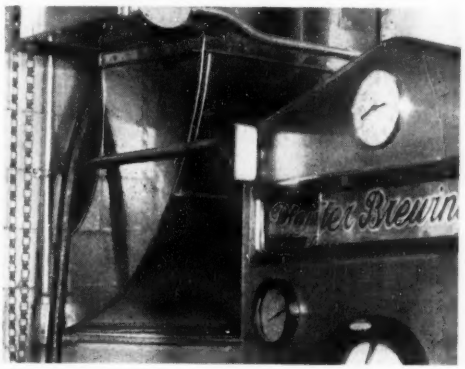


PRECIPITRON (Westinghouse unit) cleans air electrostatically by trapping particles as small as 1/250,000 in.

And tubes kill spores

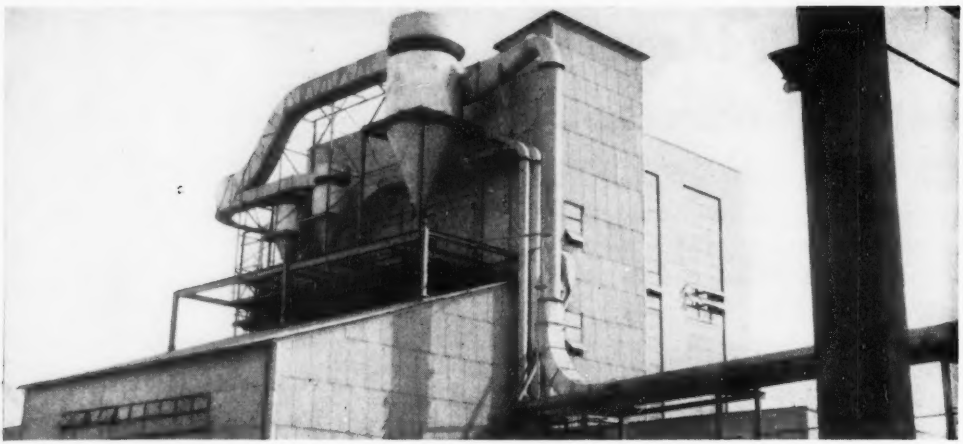
STERILAMPS (Westinghouse) give off bactericidal rays that render air virtually free of yeast and mold.

Then pure air flows in



DUCT delivers this pure, dust-free air to wort coolers installed in specially built, leakproof room.

The 34-incher moves 700 lb. a min. of corn gluten feed . . .



BIGGEST of three lines, running 300 ft. from corn oil house to packing house, is 34-incher carrying 700 lb. a min. of gluten feed. Other two, both 18 in., transport 75 lb. a min. of corn oil meal and gluten meal.

Air Conveyors Do Versatile Job

Both basic considerations of pneumatic bulk-handling and advanced engineering technics employed at Staley plant are revealed

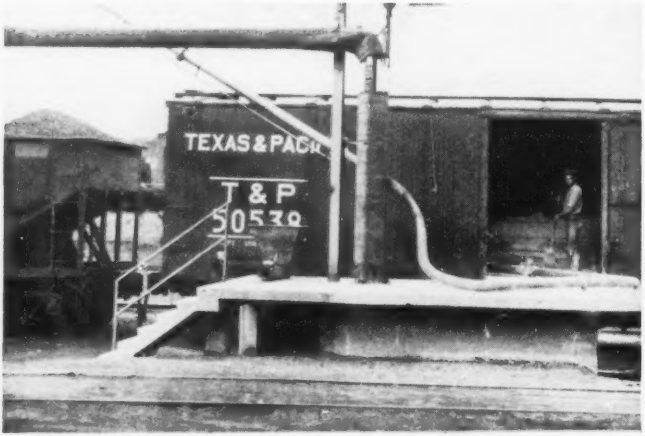
EDWIN O. CRAWFORD
Project Engineer,
A. E Staley Manufacturing Co., Decatur, Ill.

In a single minute, 700 lb. of corn gluten feed is transported through a 34-in. pneumatic conveyor at the corn and soybean plant of A. E. Staley Manufacturing Co. at Decatur, Ill.

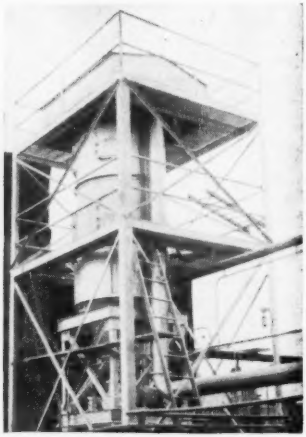
Such air movement of raw materials, ingredients and finished products is common at this plant. Engineers estimate there are 6,500 ft. of pneumatic conveyors with a total capacity of 175 tons per hour.

These systems represent advanced engineering in the application, selection and design of pneumatic con-

Two Other Advanced Installations: Unloading boxcars of lime and . . .

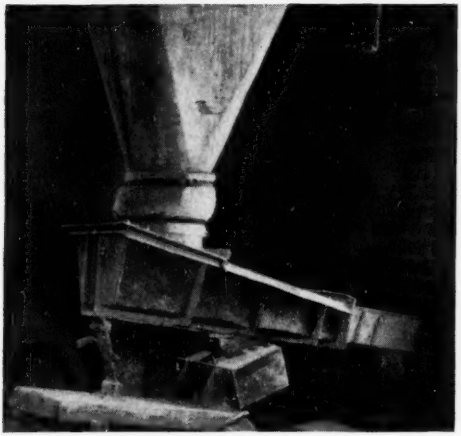


ENTIRE BOXCAR is quickly unloaded at rate of 10 tons an hour via this 5-in. line. Pick-up end in car is moved about like vacuum cleaner.



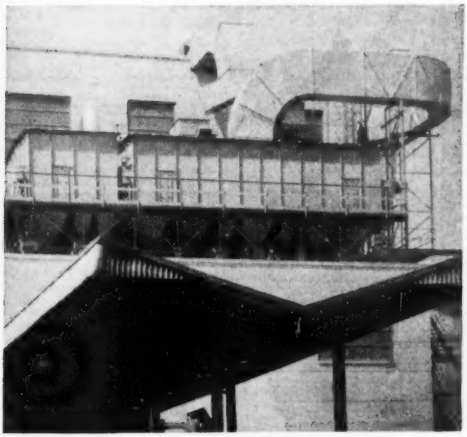
SEPARATING CYCLONE is about 250 ft. from railroad tracks.

. . . using this vibratory feeder . . .



MATERIAL for 34-in. conveyor feeds from hopper through vibrating section to air line.

. . . and shaking-bag dust collector



DUSTY AIR goes into these shaking-bag collectors from whirling tops on cyclones (seen in first photo).

veyors. They also embody innovations developed by company engineers to overcome special problems at the plant.

Where, why, and how the company uses this form of pneumatic materials-handling is actually a practical summary of what can be done with air conveyors in food plants everywhere. ■ **The versatility of pneumatic conveyors as a transport medium is illustrated by the long list of materials that the company moves by air. Included are: Starch, soybean meal and cake, spray-dried syrups, corn germs, wet bran, corn gluten meal, corn oil meal and lime, and corn gluten feed.**

Company engineers are of the opinion these conveyors could also be employed for whole corn and soybeans, if such installations were found warranted.

Mechanical or Pneumatic?

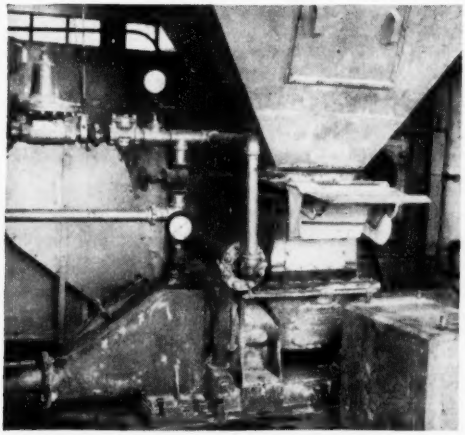
In a plant that stretches over a 400-acre site and processes as much as 3,800,000 bu. of grain in a month, pneumatic conveyors are seen the best answer for long-haul movement of materials. A summary of factors that the engineers consider in selecting a system for bulk handling of materials follows:

1. *First Cost.* The initial installation costs for pneumatic conveying systems are less than those for mechanical conveyors, except for extremely short distances or heights.

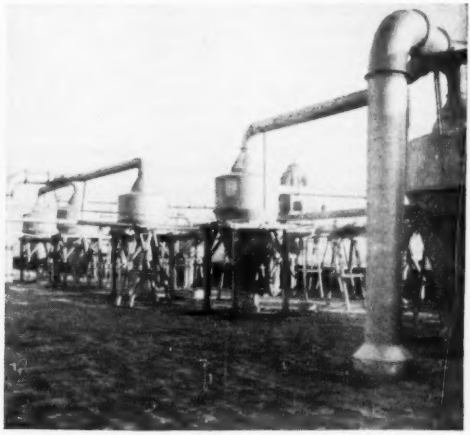
2. *Distance.* A long, curved traverse favors air conveyors, while short, straight distances favor mechanical conveyors.

3. *Maintenance.* Air conveyors require less maintenance work than mechanical. The former need attention only at specific points, since the main portion of a system—the steel tubing—is relatively simple to keep in top operating condition.

. . . moving starch from grind building to packing house

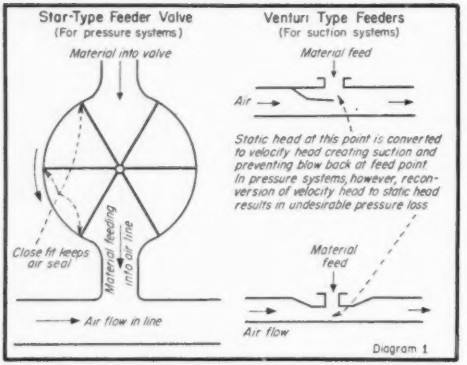


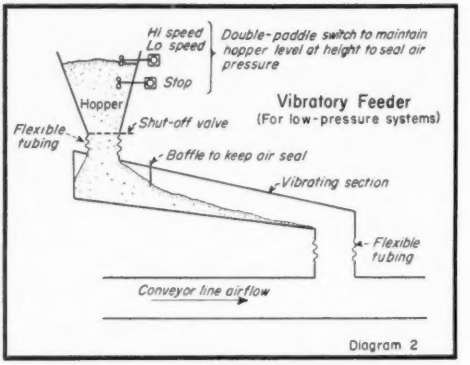
AT FEED END of 400-ft. line, starch falls from hopper into screw conveyor, then is forced into air line.



STARCH from grind building is received in these cyclones mounted on top of Staley's packing house.

Different feeders used on pneumatic conveyors


Star-Type Feeder Valve
(For pressure systems)
Material into valve
Close fit keeps air seal
Material feeding into air line
Air flow in line
Venturi Type Feeders
(For suction systems)
Material feed
Air
Static head at this point is converted to velocity head creating suction and preventing blow back at feed point. In pressure systems, however, reconversion of velocity head to static head results in undesirable pressure loss
Material feed
Air flow
Diagram 1



4. *Operating cost.* Mechanical conveyors get the nod here because of lower power requirements.

5. *Operation.* In general, the higher-pressure pneumatic systems need less operating attention than mechanical conveyors, while the opposite is sometimes true for lower-pressure units.

6. *Construction.* It is easier to install merely piping and supports, in the case of air conveyors, than it is to put in the heavier mechanical units.

7. *Dust.* If a material forms a large amount of dust when being conveyed by air, bag-type collectors are needed. At some point it becomes advantageous to use mechanical conveyors.

8. *Sanitation.* Air conveyors continually clean and polish themselves and there are no corners or pockets in which incrustations may form.

9. *Moisture content.* Some materials are too wet to convey by air, but there is no single upper moisture limit, hence each substance should be considered separately. Other materials require pre-conditioning of the conveying air, which can be accomplished in most installations. There is some drying and cooling action in air systems. This can be either very helpful or a downright nuisance. Again, each material presents its own problems.

10. *Particle breakage.* If particles are in any way delicate, and if breakage is detrimental to subsequent use, they should not be put in an air line.

It should be pointed out here that pneumatic conveyors can be almost entirely free of explosive hazards if all equipment is grounded and proper air seals are provided with feeder valves.

Different Air Systems

At Staley's, pneumatic conveyors are classified according to the pressure differential in the line. Although some are referred to as "higher-pressure" types, it should be kept in mind that even the highest pressure system (20 psi.) is really in the low-pressure range.

In the higher-pressure category are those using: (a) Plant compressed air and screw-pump feeding, (b) positive displacement blowers, and (c) centrifugal high-speed blowers. The lowest pressure system employs a medium-speed centrifugal blower or fan.

The first-mentioned system conveys materials with a pressure drop between 10-20 psi. Since compressed air from the plant system is used, conveying is by pressure only, rather than by both pressure and suction as is the case with the other systems. Only about 1 cu. ft. of air per pound of material is needed. Feed-in is by a choke screw—perhaps better called a screw-pump—whereby the material is forced into the line, with no chance of air leaks.

Less Choke-Up Trouble

This system has many advantages where the material can be gravity-fed to the screw pumps. The small amount of air used means smaller dust collectors (some materials don't require any dust collectors at all). More material per unit-diameter of pipe can be conveyed. This results in easier construction because of smaller piping. There is less trouble due to choke-ups (when material piles up in the line and cannot be cleared by regular flow of air) in this than in any other system. Because when a choke starts, the high-pressure lines tend to clear themselves rather than encourage further choking as in the case where centrifugal blowers are used. Longer distances are possible due to the higher pressure available.

And most important, some materials, such as starch, are best fed into pressure lines by screw-pumping. These substances cannot form a tight air seal—and with any other type of feed-in, the air in the line is likely to blow back through the feed-in opening This won't happen with a choke screw.

The second-named system works with a pressure drop of from 2 to 3 psi. and can be either suction or pressure. In the former, material is introduced by Venturi-type feeders; pressure systems employ a star-type valve (see Diagram 1).

Both Venturi-type feeders diagrammed can be used. Increased velocity at the constriction reduces static pressure at that point and has the effect of suction there. However in pressure systems, the reconversion of velocity head to static head results in undesirable pressure loss. So use of Venturi feeders in pressure systems is not too wise.

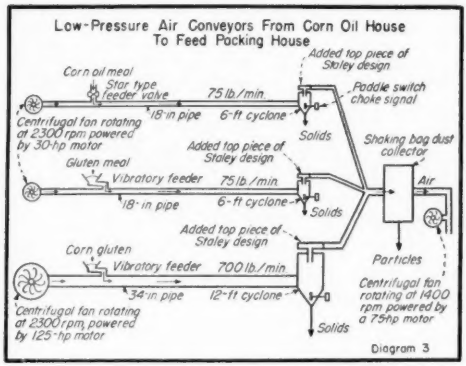
Air propulsion is with a positive displacement blower. About 5 cu. ft. of air per lb. of material is used. Velocities are lower than in first system.

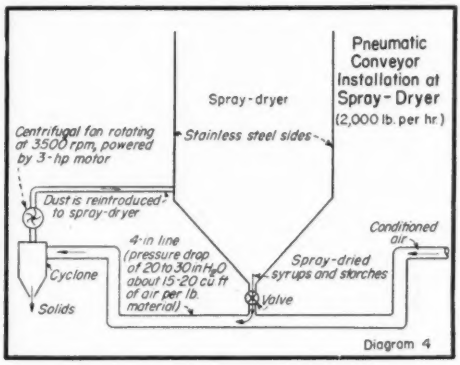
This system is cheaper than the highest pressure type, and as expected, its performance is a shade below the latter. You need a little larger piping and more dust collecting capacity because of more air required to convey. However, the star-type feeder is perfectly satisfactory for most materials.

The third-named system works with a pressure drop of 20 to 30 in. H_2O, created by a centrifugal blower, or fan, revolving at a speed around 3,600 rpm. Each pound of material requires 15-20 cu. ft. of air.

This system usually has a lower power requirement than the other two. But in case of a choke, there is a tendency to encourage it, rather than clear the line. This is because of the characteristic curve of centrifugal fans. To explain this further, when some material drops to the bottom of the pipe, it lowers the area of clear space. The still airborne material must move faster to pass the constricted spot, but in moving faster, increased pres-

Two outstanding air conveyor setups at Staley's




Pneumatic Conveyor Installation at Spray-Dryer (2,000 lb. per hr.)
Spray-dryer
Stainless steel sides
Centrifugal fan rotating at 3500 rpm, powered by 3-hp motor
Dust is reintroduced to spray-dryer
Conditioned air
4-in line (pressure drop of 20 to 30 in H2O about 15-20 cu ft of air per lb. material)
Cyclone
Spray-dried syrups and starches
Valve
Solids
Diagram 4

sure drop in the system is developed. This means less air from the blower, lower velocities in that part of the line not already choked, further dropping out of material, and so on until the entire line is plugged.

The low-pressure system employs the same type centrifugal fans, only they turn at lower speeds. Pressure drop is a maximum of 15 in. H_2O. Some 30 cu. ft. of air per pound of material is needed. Material is introduced by a vibratory feeder of Staley's own design (see Diagram 2) or a star feeder.

Key to the vibratory feeder is a baffle that prevents air in the line from backing out. This unit is only for low-pressure systems, since the baffle will seal pressures up to 15 in. H_2O. Flexible tubing at the hopper and pipe-opening permits rapid vibration. A double paddle switch in the hopper maintains the level of material at a height that seals air pressure in the line.

The big advantage of this system is that it is possible to cool the material considerably because of the great amount of air present. This system requires largest piping, chokes most readily, and needs large-capacity dust collectors.

Selection Factors

To sum up the factors determining which type of air conveyor to use, you must consider:

1. Amount and type of material to be conveyed
2. Whether purpose is the cooling or conditioning of material
3. Power requirement—cost of operation
4. Size of pipe—cost of installation
5. Tendency to choke—maintenance costs
6. Type of feed necessary to prevent back-up

Assuming the plant layout permits either suction or pressure systems, the choice may be made after you consider the following: It's easier to feed in with a suction system because there is no danger of air backing up into feed opening. But a pressure system will tell you whether there's a leak in the line.

Automatic Signals Prevent Choke-Ups

Perhaps the biggest bugaboo in pneumatic conveying is the danger of choke-ups. If one occurs, you've got a whole line with material just lying on the bottom. It can take a whole day to clear say an 18-in. pipe that's choked for 200 ft. To avoid these mishaps, Staley uses two types of automatic signals.

The first is a bin signal with paddle shaft extending to near the bottom of the dust-collecting cyclone. It's simply a paddle that is turned by a very small motor. If a choke starts, the material piles up and prevents the paddle from turning. This actuates a signal or automatically shuts off the feed-in.

The second signal, good only in a pressure system, is a pressure switch placed right after the fan. When a choke-up starts, the pressure at the feed-in end of the line builds up and the switch operates a signal. Then the feeders can be shut off.

Use Latest Dust Collectors

Three kinds of dust collectors are employed at the plant—one of them of recent design. After dust is separated from solids in standard-type cyclones, it is recovered in either a well-known shaking-bag filter, a wet collector, or new blow-ring bag filter.

In the first, dust is caught on the outside of a bag, the air passing through the inside. Periodically, particles are discharged to the bottom by shaking. In the newer blow-ring type, particles are deposited on the inside of a cylindrical bag, the air passing through. A circular ring moves vertically along the outside of the bag and discharges high-pressure air through perforations in the inner periphery of the ring. This causes the particles to drop out the bottom, where they are collected.

In the wet collector, dusty air is blown through a fan with wetted vanes. Dust deposits on the vanes, which are kept wet by a continuous spray—latter being most anything that is circulated back to the process. Staley usually uses gluten water, recirculated to feed going into the dryer.

Specific Installations

Specific data on the outstanding pneumatic conveyor installations at the plant follow: In most of the systems, electrical interlocking ties together the air conveyors with working equipment, making the entire system somewhat automatic. It is also a further precaution against plug-ups, in case succeeding equipment fails.

As pictured at the beginning of this article, and in Diagram 3, there are three lines that go from the corn oil house to the feed packing house. They are 300 ft. long. One 18-in. pipe carries 75 lb. a min. of corn oil meal, another 18-in. line carries gluten meal at the same rate, and the largest pipe in the plant, a 34-incher, transports 700 lb. of corn gluten feed every minute.

They are all lowest-pressure systems, with fans behind each feed-in point. As indicated in the diagram, all fans turn at 2,300 rpm. The 18-in. lines have 30-hp. motors on the fans, while the 34-in. pipe needs 125 hp. Each of the smaller lines runs into a 6-ft. cyclone, while the large pipe has a 12-ft. cyclone. All cyclones have paddle switches to detect beginnings of choke-ups.

Velocity in the 34-in. line is 6,000 fpm., and density of the corn gluten

feed is 48 lb. per cu. ft. Material in the two 18-in. lines weighs about 40 lb. per cu. ft., and travels at 5,000 fpm.

An advanced unit is the centrifugal discharge top added to each cyclone. Dusty air comes out the top of cyclone with a whirling motion, and leaves the top piece on a tangent, thereby converting centrifugal velocity into straight line velocity. Advantage of the top piece is the reduced pressure drop and less vertical height required. It replaces the old sweep-elbow type of discharge.

In this particular group, all three cyclones discharge into one shaking-bag filter. A fan rotating at 1,400 rpm. and requiring 75 hp. pulls on the other side of the filter.

The 18-in. line for corn oil meal has a star-type feeder, while the other two use the company-designed vibratory feeder.

Spray-Dried Syrups and Starches

A particularly advanced unit is the air conveyor (see Diagram 4) at the recently installed spray dryer. Both syrups and starches are handled. A 4-in. line conveys 2,000 lb. per hour of either material.

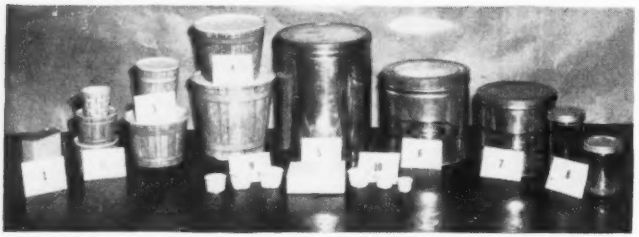
It is a 20 to 30-in. H_2O pressure-drop system. Its unique aspect is that here no dust collection is necessary.

A centrifugal fan is located on top of the cyclone. Rotating at 3,500 rpm. and requiring only 3 hp., it pulls conditioned air into the open end of the line. The spray-dried material feeds from the bottom of the spray dryer. The mixture then enters a cyclone which separates solids and dust. But instead of collecting the dust, it is reintroduced to the spray-dryer.

Conditioned air is necessary for moisture control of the hydroscopic material being handled.

Entire boxcars of lime and re-

(*Turn to page* 219)



CONTAINERS used in frozen-egg packaging tests—ten types investigated.

Now—The Consumer Frozen-Egg Pack

Professor tells how to put up eggs in small-size metal cans, freezer jars, and souffle cups

A. R. WINTER

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Ohio State University, Columbus, Ohio

Additional customers for frozen eggs could well be developed among housewives, small bakers, and restaurants if the products were packaged in suitable small containers.

One food firm, the Max Gross Egg Co., Chicago, is already marketing frozen egg whites in small tin boxes holding six each. They are being sold in the frozen food departments of Hi-Lo Chain Stores and Marshall Field department stores.

Here at Ohio State University, we have compiled some interesting data on the packaging and freezing of eggs in small metal cans, freezer jars, and souffle cups in cardboard boxes (photo shows containers tested).

The following times are required to freeze different-sized metal cans containing whole egg to 10 deg. F. in still air in a freezer at 0 deg. F.:

Size of Can (lb.)	Time to Freeze (hr.)
30	44
17	40
10	32
2	17
1	10

Use of as little as a single white or yolk at a time is possible by packaging one unit in the smallest size souffle cup (marked "10" in photo). A number of these cups are then placed in a cardboard box which is wrapped with cellophane and frozen. Thus, the consumer may use one souffle cup at a time without defrosting the entire package. Contents slip out much like ice cubes out of tray, with little sticking if removed before completely defrosted.

Whole eggs, whites, or yolks may be packaged in this manner, which is similar to the way candy is boxed. It costs about 5c. per dozen eggs, or about twice as much as shell eggs in cartons.

Actually, it is doubtful if individual containers are necessary, since most recipes call for two, or multiples of two, eggs. Moreover, defrosted egg products of normal quality will keep for 1 to 2 weeks in a household refrigerator, hence an ice cream cup holding 4 to 6 units would seem to be the smallest needed (top container marked "2" in photo). A ½-pt. cup filled within ½ in. of the top holds 4 whole eggs or 8 yolks or whites.

Such size containers may be filled quickly and frozen continuously.

Pint-sized freezer jars (marked "8" in photo) and souffle cups in boxes as described above were filled with liquid whole egg, then frozen and held at +20, +10, 0, and −20 deg. F. for one year. The frozen whole egg stored at +20 deg. F. appeared to be normal and as good quality as when frozen and held at lower temperatures.

An analysis for standard plate bacteria count and solids yielded the results shown in the accompanying table.

TABLE—BACTERIA COUNTS and Percent Solids of Liquid Whole Eggs Packaged in Freezer Jars and Souffle Cups and Held at Varying Temperatures. Storage at Any Temperature Within the Range Tested Appears to be Satisfactory.

Freezing and Storage Temp. (deg. F.)	Freezer Jar		Souffle Cup	
	Bacteria per gm.	Percent Solids	Bacteria per gm.	Percent Solids
+20	24,300	24.9	25,500	27.9
+10	30,000	25.2	28,900	25.8
0	88,000	24.9	53,500	25.7
−10	97,500	24.9	.....	...
−20	8,200	25.2	5,300	27.4

TREATED with new antioxidant, these nuts retained their quality more than twice as long. Left and foreground: Blanched and unblanched Virginia-type peanuts. Right: Blanched Spanish peanuts.

BHA Ups Shelf Life of Salted Nuts

Fresh aroma and flavor last longer when butylated hydroxyanisole is added to cooking oil and salt. Life of oil extended, too. Peanut butter aided

S. R. CECIL, and J. G. WOODROOF
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Extension of shelf life of salted nuts by as much as 137 percent has been effected by the use of butylated hydroxyanisole (BHA) in the cooking oils and the salt.

And, by protecting the quality of the nuts toward the end of the continuous cooking period, life of the oils has been extended approximately 30 percent.

In the case of peanut butter, use of synergized BHA increased oven life up to 114 percent. And it augmented shelf life, after opening the jars, by about one-third.

Let us review the factors: Due to the high oil content and high cooking temperature, salted peanuts and salted pecans have a relatively short "fresh" life. As ordinarily handled, they are exposed to abundant air and light which further accelerates staleness and rancidity. These conditions necessitate frequent deliveries and pick-ups from retailers, which add greatly to the cost of the products.

Peanut butter, as generally sold in sealed glass jars, has a storage life of many months. But once the jar is opened staleness and rancidity develop quite quickly. And cooking oils lose their quality rapidly during the cooking operation.

In an attempt to discover a way to increase the life of these products, intensive studies were conducted on the use of butylated hydroxyanisole as an antioxidant in laboratory-prepared samples of salted peanuts and pecans. The most promising treatments were then used on commercial runs of salted peanuts and peanut butter.

With the exception of the commercial test with blanched salted peanuts, the BHA was used in two forms: Plain or unsynergized, and in synergized mixture with propyl gallate and citric acid in propylene glycol*. In the latter form, concentrations of propyl gallate and citric acid were 0.3 and 0.2 percent the concentration of BHA, respectively. All treated cooking oils contained 0.02 percent BHA dissolved in a small amount of the oil and stirred into the main body after it had reached approximate cooking temperature.

Treated salt for application to nuts contained 0.2 percent BHA, prepared by thoroughly mixing the required amount of antioxidant into commercial grade fine nut salt for commercial tests. For laboratory trials, C.P. fine NaCl was used. The nuts received approximately 1.5 percent by weight of these salt mixtures, giving about 0.003 percent BHA on the surface.

In the laboratory, 20 lots of pecan meats were cooked in each of three batches of coconut oil, and 20 lots of unblanched peanuts in each of three batches of coconut and three of peanut oil, or a total of 30 lb. of pecans and 90 lb. of peanuts in 24 lb. of oil. Oils were used untreated, treated with BHA, and with BHA plus synergists. Alternate batches from each were salted with plain salt, BHA salt, and synergized BHA salt. Oil-to-nut ratio was 4:1, and cooking time was 5 min. per batch.

* The synergistic mixture was a commercially-available preparation obtained from Tennessee Eastman Corp. Its composition was 20 percent butylated hydroxyanisole, 6 percent propyl gallate, 4 percent citric acid, and 70 percent propylene glycol as the carrier.

Curves and Columns Show How Products Keep Longer

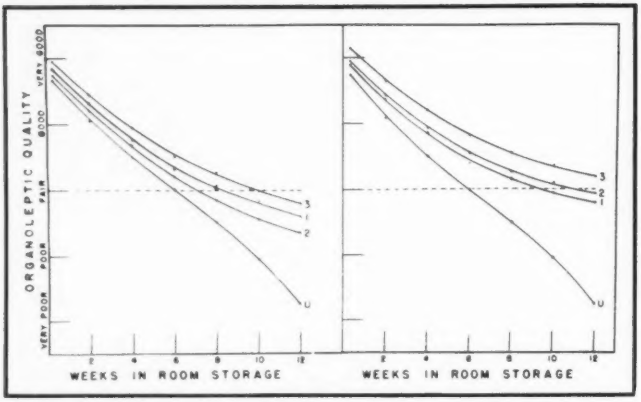


FIG. 1. PEANUTS remained fresh tasting 79 to 133 percent longer when stored at room temperature. Curves (left) show effect of BHA alone. Those at right show how synergists boosted antioxidant's action. (U) untreated, no antioxidant; (1) BHA in cooking oil; (2) in salt; (3) in both oil and salt.

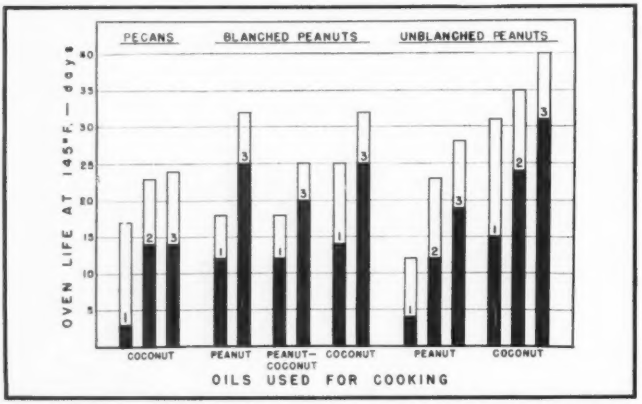
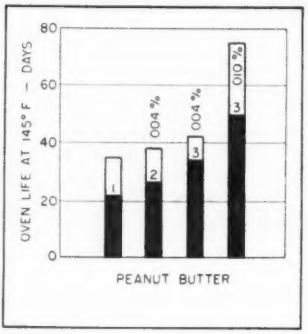
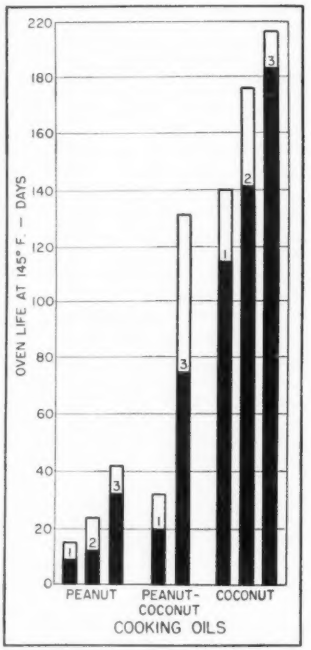


FIG. 2. WHEN STORED at 145 F., both fresh and total life were extended. Solid columns represent time nuts remained in perfect condition. White areas denote periods between loss of fresh quality and definite rancidity. (1) no antioxidant used; (2) BHA in cooking oil and salt; (3) synergized BHA in oil and salt.





FIGS. 3 and 4. BOTH fresh and total life of peanut butter and cooking oils held at 145 F. were definitely increased. Solid portions of columns represent time peanut butter remained in perfect condition, and days before rapid increases in peroxide values were observed in cooking oils. White areas denote periods between fresh life and definite rancidity. (1) no antioxidant used; (2) BHA alone; (3) synergized BHA.

In the commercial runs, six 1,500-lb. lots of blanched peanuts were cooked in 500-lb. batches of oil, totaling 9,000 lb. of peanuts and 3,000 lb. of oil. Each lot of nuts consisted of ten batches cooked 11 min. per batch at 325 deg. F. with oil-to-nut ratio of 3.3:1. Batches were salted alternately with untreated salt and with salt containing synergized BHA. The six oils were: Coconut, peanut, and an equal mixture of these oils, each used with and without the synergized antioxidant.

Five 100-lb. batches of peanut butter were prepared in two commercial plants. Two of these contained no antioxidant, one contained plain BHA, and one each contained synergized BHA in two concentrations. In each case the antioxidant was included in the salt, and final concentrations were 0.004 percent plain BHA, and 0.004 percent and 0.01 percent synergized BHA.

Testing of the salted nuts and the oils used, and of the peanut butter, was carried out after room and oven storage, by a taste panel and by checking increases in the peroxide values. The products were stored in the room in original containers until tested, and in the 145 deg. oven in small covered beakers with lips. Oils were extracted from the nuts and butters with carbon tetrachloride, and peroxide values determined on the extracts by the method of Stansby[2], using CO_2 to exclude atmospheric oxygen during the reaction period. Taste testing was done by an experienced panel of ten judges for the room tests. The scoring system was a numerical rating scale of 0 to 10, based on five quality descriptions as shown in the ordinate of Fig. 1. On this scale an average score of 5 or

"fair" was considered the borderline for acceptable shelf life. Samples stored in the oven were scored "fresh", "stale", or "rancid" by three judges familiar with this test, which was essentially the method of Schaal as used by Joyner and McIntyre[3].

Results of the tests were studied by the customary analysis of variance technic, using average values (instead of replicates) to shorten the procedure, and testing for significance of variations by comparing single treatment factors with corresponding interactions of the factors. In every instance, effects of using the antioxidant were significant, unless otherwise stated.

Use of BHA alone, or in the synergistic preparation, gave beneficial results in every instance in the laboratory experiments. This was indicated by increased oven life of cooking oils and peanut butter, and by increases in both shelf and oven life of nuts cooked in treated oil or sprinkled with treated salt (see Figs. 1, 2, 3 and 4).

There were, as seen in Table I, differenees in pecans and peanuts, and Tables I, II, and IV show differences due to types of cooking oil used. But these variations from product type acted only in altering the degree of effectiveness of the antioxidant, in no ease rendering it completely ineffective. Generally, salted peanuts remained good longer than salted pecans, unblanched peanuts slightly longer than blanched peanuts, and coconut oils held up better than peanut oils. Nuts cooked in peanut oil, however, were usually judged slightly better by the score panel because of less dry appearance.

Effective in Commercial Tests

Results obtained in commercial use of the synergized BHA were more consistent than those from the laboratory preparations. And there was less variation in scores received by nuts cooked in coconut and peanut oils. In every trial, the antioxidant was slightly more effective in salt than in oil, and best results were obtained by using it in both.

Peroxide values were determined on oils extracted from the nuts on the commercial test at intervals up to 84 days. The synergized BHA was slightly more effective in lowering peroxides when used in oil (Table III), for thus its protective action was exerted earlier than when used in salt. The most effective use was in both oil and salt. Influence of coconut oil in keeping peroxides low is seen in the nuts cooked in the mixed oil, which was not true of organoleptic quality.

Another advantage in the use of BHA was the increase in number of cookings that could be obtained from an oil before quality of the nuts began to

Benefits Vary With Nut Varieties and Oil Types

TABLE I—BHA INCREASED Schaal Oven Life and Room Shelf Life of Unblanched Salted Nuts

		Antioxidant Used		Schaal Oven Life		Room Shelf Life
Type of Nuts	Cooking Oil	In Cooking Oil	In Salt	Fresh Days	Total Days	Total Days
Pecans	Coconut	None	None	3	17	30
		None	BHA	7	19	41
		None	Synergized BHA	12	23	47
		BHA	None	7	21	35
		BHA	BHA	14	23	39
		BHA	Synergized BHA	14	24	47
		Synergized BHA	None	9	21	40
		Synergized BHA¶	BHA	14	23	51
		Synergized BHA	Synergized BHA	14	24	71
Peanuts	Coconut	None	None	15	31	42
		None	BHA	19	33	50
		None	Synergized BHA	21	35	68
		BHA	None	22	33	65
		BHA	BHA	24	35	75
		BHA	Synergized BHA	28	38	82
		Synergized BHA	None	26	35	72
		Synergized BHA	BHA	28	38	84
		Synergized BHA	Synergized BHA	31	40	98
Peanuts	Peanut oil	None	None	4	12	67
		None	BHA	8	18	72
		None	Synergized BHA	14	21	82
		BHA	BHA	12	23	76
		BHA	Synergized BHA	17	24	82
		Synergized BHA	BHA	14	26	89
		Synergized BHA	Synergized BHA	19	28	105

TABLE II—SYNERGIZED BHA AUGMENTED Schaal Oven Life and Room Shelf Life of Blanched Salted Peanuts

		Schaal Oven Life		Room Shelf Life
Cooking Oil	Antioxidant	Fresh Days	Total Days	Total Days
Coconut	None	14	25	56
	In oil	20	27	59
	In salt	21	28	63
	In oil and salt	25	32	66
Peanut	None	12	18	54
	In oil	13	20	59
	In salt	17	24	66
	In oil and salt	20	25	68
Coconut-peanut mixture	None	12	18	52
	In oil	15	20	56
	In salt	17	24	60
	In oil and salt	20	25	61

TABLE III—PEROXIDE FORMATION in Blanched Salted Peanuts Stored at Room Temperature Was Inhibited by Synergized BHA

		Peroxide Number (millimols 0 per kg. oil)			
Cooking Oil	Antioxidant	2 Days	28 Days	56 Days	84 Days
Coconut	None	1.7	6.2	9.7	10.5
	In salt	1.4	5.1	7.4	8.8
	In oil	1.1	5.0	6.7	8.1
	In salt and oil	1.0	3.6	4.9	6.2
Peanut	None	2.1	7.1	10.7	15.9
	In salt	1.7	6.0	8.5	10.3
	In oil	1.1	5.2	7.3	8.3
	In salt and oil	0.9	4.0	6.1	6.9
Coconut-peanut mixture	None	1.3	6.5	9.6	11.3
	In salt	1.1	5.8	8.4	9.2
	In oil	0.7	5.4	6.8	8.0
	In salt and oil	0.5	4.9	5.8	7.6

TABLE IV—SCHAAL OVEN LIFE of Refined Coconut and Peanut Cooking Oils Was Increased by BHA

		Fresh Oven Life		Total Oven Life	
Type of Oil	Antioxidant	Days	Peroxides Daily Increase M-m 0/Kg. Oil	Days	Peroxides Daily Increase M-m[0./Kg. Oil
Coconut, unused	None	114	0.1	140	0.2
	BHA	141	0.1	176	0.1
	Synergized BHA	183	0.1	216	0.1
Same, used for 10 cookings	None	100	0.1	130	0.2
	Synergized BHA	131	0.1	185	0.1
Peanut, unused	None	9	1.8	16	2.4
	BHA	12	1.5	24	1.4
	Synergized BHA	32	0.6	42	1.4
Same, used for 10 cookings	None	6	1.3	10	3.3
	Synergized BHA	15	1.3	25	2.0
Coconut-peanut mixture	None	20	0.3	32	1.4
	Synergized BHA	75	0.1	131	0.2
Same, used for 10 cookings	None	14	0.7	20	1.8
	Synergized BHA	44	0.2	60	0.6

TABLE V—BHA EXTENDED Schaal Oven Life of Peanut Butter

Type and Amount of BHA	Fresh Oven Life Days	Total Oven Life Days
None	21	35
BHA, 0.004 percent	26	38
Synergized BHA, 0.004 percent	34	42
Synergized BHA, 0.010 percent	49	75

drop off: Samples were taken and averaged from each run after a third of the total cookings was completed, or after each three cooks.

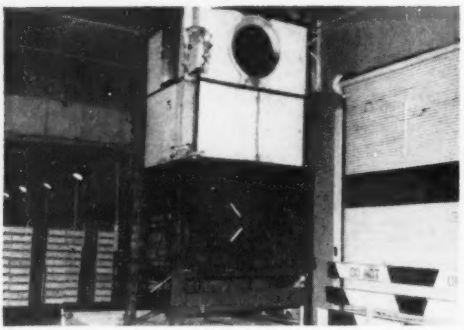
In the absence of BHA, nuts taken after the seventh batch were inferior in quality. But with the antioxidant, the quality held up through the tenth batch. This represents an increase in cooking life of oil of about 25 percent when the operation was done at a single heating. Reports from plants where cooking was done over an extended period of intermittant heating and cooling indicate increases in cooking life up to 300 percent.

In Peanut Butter, Too

In the case of peanut butter, no consistent differences due to antioxidant treatment were noticeable within one year at room temperature as long as the samples were kept sealed in the original glass containers. After the samples had been opened, flavor of the untreated product did not remain good as long as that of the treated samples. The difference amounted to several days at room temperature, and to about three weeks in a household refrigerator. A 0.01 percent concentration of BHA was more effective than 0.004 percent.

The most outstanding effect of butylated hydroxyanisole in the tests was its ability to extend the period of storage life before natural fresh aroma and flavor began to fade out. Increases

(*Turn to page* 223)



CONVERTING this heater to cooler meant reversing top fans, adding lower ice chamber. Now, warm air is drawn in at top, forced down over ice. Cool air blows out bottom.

CANVAS curtains, fireproof hardboard insulate refrigerated area. Here, with curtains raised, trucks back in and load perishable fruits.

Heaters Keep Perishables Cool

—at this New York pier where 1,400,000 cu. ft. of 40-deg.-F. storage space now lengthens life, holds quality of fruits in warm months

A simple conversion of blower units from heating to a cooling cycle has yielded 1,400,000 cu. ft. of refrigerated space in a Pennsylvania Railroad pier in New York City. Thus, perishable fruits are kept at top quality during the hot months while they await transportation to wholesale markets.

■ **Food processors who store similar produce as raw material may find what this railroad did is the answer to their quality-keeping problems.**

Previously, perishables received at Pennsy's Hudson River piers from southern and western producing areas remained in the hot bulkheads from two to twelve hours before being bought and trucked to wholesale markets. Exposure to heat greatly impaired quality and appearance of the produce and shortened its life.

Now, an 850-ft. long, 40-ft. wide, and high, portion of the bulkhead in Pier 27 is cooled to 45 deg. F. from May 15 to Oct. 15. Fruits such as cherries, grapes, peaches, nectarines, apricots, plums and figs come out of refrigerated railroad cars at 40 deg. F. and retain their freshness when transferred to the cool pier room.

Convert Heating Blowers

Key to the new system are six blower units evenly spaced along the length of the cold room. They were originally used to distribute heat from steam pipes during winter. Then they consisted of only the top section (white part in photo). Two 36-in.-dia. fans inside drew cold air over steam pipes. After becoming hot, air was then blown out at the top by two more 36-in. fans.

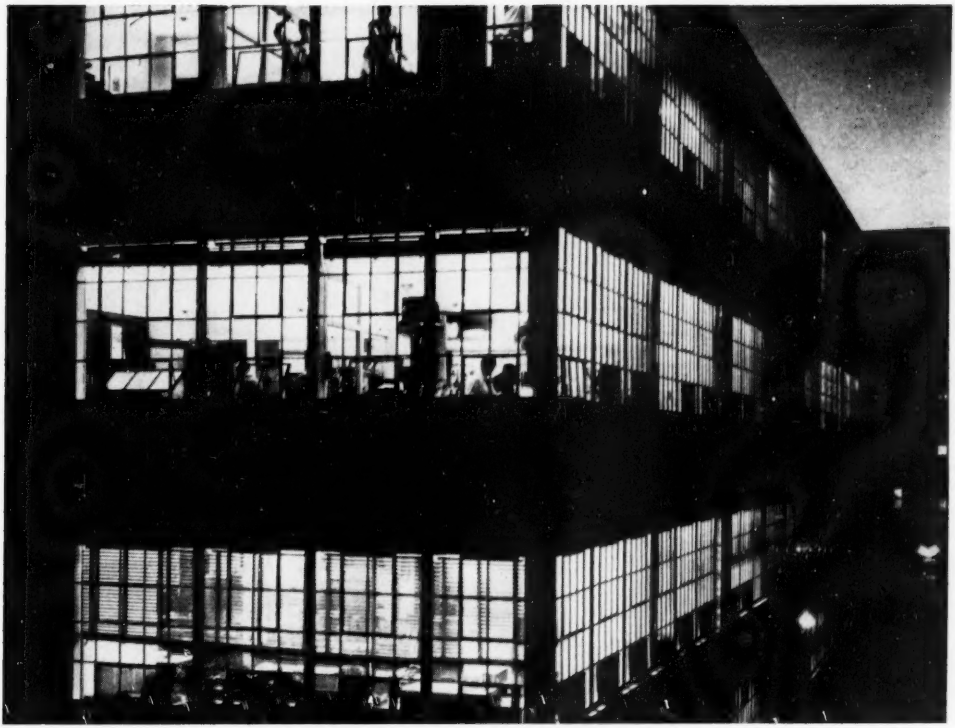
These blowers were converted so that they could "double" by performing a cooling operation during summer. For this use, a bottom section (dark part in photo) was added to each of the six blowers, and the fans in the top section reversed. Bottom part is a chamber for holding cake ice, complete with drainage pans and baffles.

In the cooling operation, hot air is drawn in at the top, then forced down over the ice and out the sides and bottom of the new chamber.

Each blower has a 7½-hp. electric motor driving the four fans. The chamber holds 20 300-lb. cakes of ice. On an ordinary hot day, two loads of 20 ice-cakes in each of the six blowers are necessary to maintain a 45-deg.-F. temperature for the average four hours necessary, a total of 72,000 lb.

The 1,400,000 cu. ft. of refrigerating space is insulated by fire-proof hardboard overhead and on one side. These two surfaces face the outside and still have the original corrugated sheet steel. On the other side, canvas curtains were installed. Each of these is 40 ft. long and can be raised to allow trucks to load up.

Total cost of the installation was $20,000. This included canvas curtains, hardboard insulation, ice chambers and labor. Penn Stevedoring Corp. handled construction, completing the job in three weeks.



GF's Central Laboratories is always a beehive of activity. Here, highly skilled organic chemists, biochemists, physical chemists, engineers, bacteriologists, and food technologists handle some 200 research projects every year.

Research That Spells Results

General Foods Has Achieved It by Skillful Organization

Thus it maintains top products in the vanguard of competition, keeps its operations in the forefront of consumer demands, and consistently contributes in raising nutritional levels

R. C. REEVES

Research & Development Department,
General Foods Corp., New York City

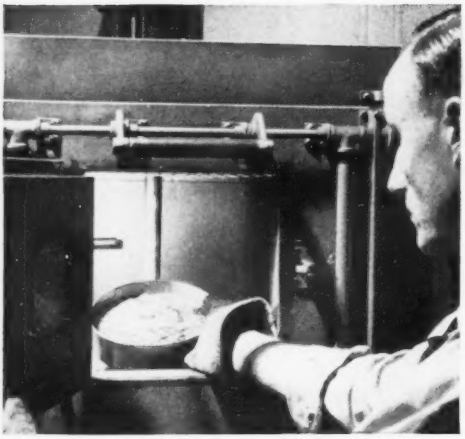
Prime example of how a food company can tremendously expand its research—and make it pay—is offered by General Foods Corp.'s major research facility, the Central Laboratories in Hoboken, N. J.

Let's start at the beginning:

The story of GF's research on a corporate basis starts back in the early '30s when the several companies were banded by the new firm. As with any new organization in the process of consolidating and expanding, the many research activities already going on in the individual plant laboratories were not very well coordinated.

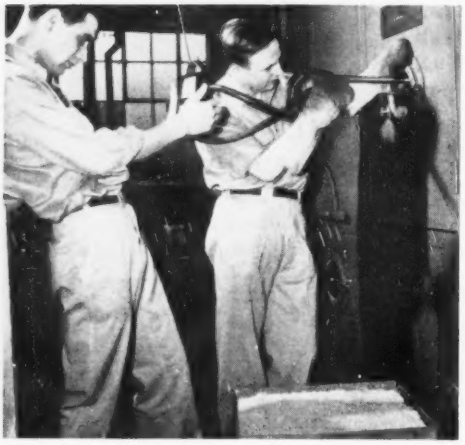
Knowing that in the overall view, research did not follow a well-planned program, and that there were duplications and omissions, GF made its first step to tie together this research in the middle '30s by expanding its leading facility—the Post Cereals Laboratory at Battle Creek—so it could consolidate former loose ends.

This laboratory was provided with facilities and staff to permit the handling of corporate research problems as well as the immediate ones of the cereal business. At the same time, the other laboratories of the organization were encouraged to continue their research until major jobs could be absorbed by the corporate laboratory. Contact and consulting services were then added to help these laboratories in their work and to provide liaison between the various laboratories and management.



MATERIALS for basic studies on maple flavors, developed by roasting, are prepared in organic chemistry lab.

BIOCHEMISTRY SECTION uses Geiger counter and oscillograph to gage intensity of radioactive substances.



FOOD TECHNOLOGISTS employ pilot-plant unit to determine optimum drying conditions of shredded potatoes.

MEMBERS of the food technology laboratory learn what washing does to rice grains. Scene is in pilot plant.

Time soon proved these moves were not entirely adequate. The number of research problems assigned to the Battle Creek laboratory and those originated by the laboratory itself became too much for it to take care of. What's more, there was a need for even greater concentration of research activities, more management participation in research pursuits, and a geographical relocation of the work nearer to the main executive offices.

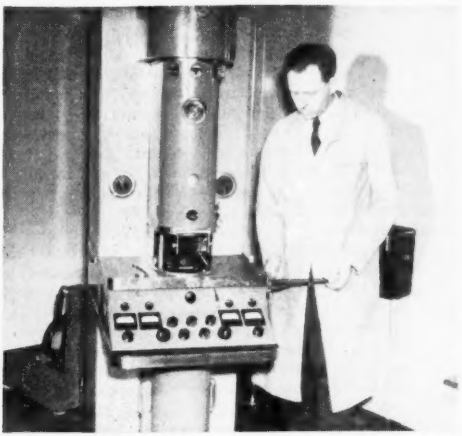
Why Central Lab Was Formed

The second change came in 1939, when larger facilities—the Central Laboratories—were built in Hoboken. Here, most of the Corporation's research activities were centralized in one building, close to the general offices in New York City. And here, too, was an excellent source of managerial help on technical problems. The New York area was also recognized as outstanding for technical information and services.

The entire set-up of Central Laboratories was designed to provide an integrated group of highly skilled specialists—organic chemists, biochemists, engineers, bacteriologists, food technologists, and librarians, all with the best equipment and facilities. No one-division laboratory could afford to maintain such a staff or to purchase equipment of this nature to work out its problems.

Through teaming of creative thinking, individual ability and initiative, along with the center's services, over the several plants, these specialists now get results that no single plant lab could ever produce. Thus the best qualified group of technicians can be mustered to handle any problem.

More than 60 percent of all General Food's research is currently carried out by the Central Laboratories' staff of 250. GF's total annual program costs well over $2,500,000. In the interests of its huge packaged grocery specialty business, this research organization tackles some 200 projects every year. About 100 more projects —some very comprehensive—are handled by decentralized plant laboratories throughout the country.



COSTLY electron microscope in physical chemistry department reveals objects beyond range of ordinary equipment.

STRUCTURES of rice grains, important in understanding Minute Rice process, are studied by physical chemist.

TASTE-TESTING, an essential step in food research, is performed by this special products evaluation group.

PERFORMANCE of packages is determined by holding them under controlled conditions in packaging lab.

Providing a total working area of 42,000 sq. ft., the Central Laboratories' space is allotted as follows: Over 22,000 sq. ft. to laboratories; 6,000 sq. ft. for pilot activities; 6,000 sq. ft. for offices; 2,600 sq. ft. for service areas (glass blowing, receiving and shipping, and mail and storage rooms); 1,400 sq. ft. for library and 3,300 sq. ft. for shops.

The Hoboken laboratory is divided on a functional rather than product basis. Supported by the business, supply, shop, and library areas, all vital to smooth operation, the research area itself is divided into six divisions: (1) Organic chemistry, (2) biochemistry, (3) physical chemistry, (4) engineering research, (5) food technology, and (6) product evaluation. Each reports to the laboratory manager's office.

To keep the company in the forefront of consumer needs and taste trends, Central Laboratories' work includes basic and fundamental as well as applied research. Of 20-odd basic research projects each year, some are aimed solely at adding valuable new information to the general fund of knowledge about food and nutrition. Many of these studies have long-range potentials for application to commercial problems.

While research is geared to give every staff member free play in using his talents, this laboratories' fullest power stems from many groups of specialists working together on specific problems. When a person in one group is confronted by a problem beyond the scope of his own specific background and training, he calls for help from colleagues in another group. By the same token, if a problem is very broad, several groups may work on separate parts of it, each contributing to the ultimate solution.

Meanwhile, there are the service groups that always clear the way for these research activities. From the library comes valuable information of past work. From the shop and supply room come the required materials and apparatus. All along, the research work is facilitated by the service areas which take care of the necessary pur-

chasing of needed supplies, as well as financial and administrative work.

As a result of such cooperation, research workers are free to devote most of their time to technical work rather than be tied down by doing their own service duties. Together with the laboratory workers, these service people carry on this business of research as members of one, well-organized team.

For the most part, whenever a problem in basic research arises, it is handled by either the biochemistry, organic chemistry, or physical chemistry laboratories. Applied research problems are emphasized in the work of the engineering research, food technology, and product evaluation laboratories, although the "basic" laboratories do a great deal of this as well. After problems are submitted to Central Laboratories, they are initially gaged, then their component parts are taken over by specialized sections.

Activities of all research groups are under the direction of a strong, cooperative management. Major function of this laboratory's management is to coordinate and expedite all research work.

Divisions Within Central Labs

The following describes the Central Laboratories of today, after ten years of operating experience:

Organic Chemistry—The important function of this department is to identify the constituents in raw materials, in foods being processed, and in finished products so as to provide a factual basis for applied research problems. For example, a great deal of work has been done on the chemistry of coffee and coffee roasting to give the factual data on which to build programs for improving the company's standard-form Maxwell House and Sanka coffees, as well as its soluble coffees. One group's time is devoted to analyzing, synthesizing, and selecting flavors (natural and artificial).

New flavors are developed, and natural flavors in foods are improved. Other typical studies are those carried out to determine the nature and extent of oxidative browning and other changes that take place in foods during processing and storage.

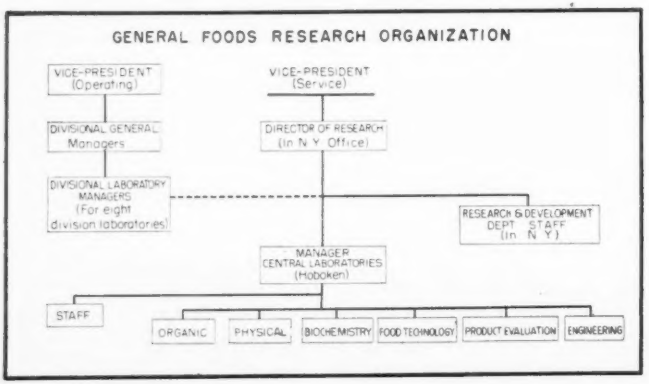
Biochemistry—This section performs bacteriological, nutritional, toxicological, and radio isotope studies. It also handles those problems requiring the fundamental biological sciences. Extensive basic studies concern protein processing and nutrition, starch behavior, and the growing and processing of cocoa.

Isotope Tracer Studies

Most of the radio isotope work is in the nature of tracer studies for determining the course of reactions, the location of reactants and, in particular, the physiological fate of certain materials. Typical metabolism work covers trace elements, starch vs. sugar, and nutritional problems of proteins. This department is equipped with radioisotope and rat-colony rooms, as well as facilities commonly found in bacteriological and biochemical labs.

Physical measuring technics are employed in the third division—*Physical Chemistry.* This group carries out precise measurements on materials to determine their physical nature. Typical problems cover particle-size distribution in chocolates and coatings, flowability of slurries, X-ray studies for crystal structure and electrophoretic investigations of colloids to determine the homogeneity of such items as pectins and gelatins.

To illustrate typical jobs, these chemists and physicists develop and use special apparatus to study possible commercial applications of infra-red, supersonic, and dielectric processing technics. This laboratory has devised numerous color measuring methods. It has developed color control procedures for many areas of the company. It has also worked with spectrophotometers, for improving analytical methods.



Microscopy is another important phase of this group's work, and equipment ranges from simple magnifiers and photographic equipment to an electron microscope. With these instruments, the relationship of particle size, structure, and shape to the other properties can be visually studied. Many development problems have been assisted by the mere fact that one can see what goes on in grinding, drying, cooking, and extracting operations.

The *Engineering Research* laboratory is primarily concerned with those jobs involving problems in design and operation of equipment. Engineering's main laboratory is the pilot plant. Here, various unit operations—drying, concentrating, mixing, cooking, and roasting—are studied under conditions approximating commercial production before they are finally adopted.

Significant contributions by this department are illustrated by new methods for making Sanka coffee, the development of soluble coffee, and comprehensive improvements in gelatin manufacture. These jobs do not stop at the laboratory door. Many things can be done only at the plants, and in all cases assistance is given the production departments in getting new processes started.

Developing New Products and Processes

The *Food Technology* laboratory devotes its studies to the development of new products and improved processing technics where the emphasis is on the nature and behavior of materials rather than on the functioning of equipment. This group developed the Minute Rice process and substituted Brazilian for Java starch in Minute Tapioca. Here, also, there is the formulating and compounding of dessert products, much of the work on pectins, the development of dog foods, nut processing, and work on the utilization of by-products.

Finally there is the sixth area—*Product Evaluation.* A fairly large share of this group's work is of a service nature, both for the rest of the laboratory and the divisions. A good part of the analytical work required by the other areas is done in a centralized analytical laboratory.

Some methods development is carried out. Typical is a spectrometric analytical technic for measuring caffein content. Compared with the former method, this new procedure enables technicians to obtain results in 3 instead of 24 hr. and with one-half the amount of labor.

In that all-important field—organoleptic evaluation—special kitchens and taste testing rooms are provided. "Expert panels" of tasters recruited from the entire laboratory staff, are

trained and employed daily. Beyond this, an intensive study of technics is carried out to improve this subjective measurement.

Comprehensive surveys of field stocks of GF products and their principal competition are performed continuously. Product and package quality measurements of this type are reported directly to management. These not only note the condition of the product at the time it reaches the grocery store shelf but also supply an independent audit of production quality control and a new and fresh look at product variables. The insurance value alone would justify the rather large cost of these surveys. But there is also the fact that many of the new ideas turned up have led to improvements in GF products.

Problems in household specialty products and certain product-and-process studies are assigned to this laboratory. Also in this division is the packaging laboratory whose function is to ascertain how much protection is needed to guard products against moisture, infestation, and other damage encountered during distribution—and how to get this protection at lowest cost. For instance, dry cereals must be put in packages that guard them from rancidity, staleness, sogginess, toughness, off-flavors, and infestation.

This laboratory now uses many special testing technics. It has developed an organic vapor-transmission test for keeping flavors in even low-cost packages. It has also worked out a method of analyzing head-space gases in vacuum-packed coffee for determining leaky cans and the efficiency of the vacuumizing operation. And new correlations between test methods and actual performance are valuable in predicting the usefulness of new papers and packages. There is hardly a GF package or case which has not been in some way improved or made less expensive by packaging research.

Other GF Research Activities

Research, after moving into Central Laboratories in 1939, proceeded according to a well-organized plan. However, one shortcoming became apparent as time went on—there had been a little too much centralization.

Here, briefly, was the picture: Because of the great distances between the Hoboken laboratories and GF plants spread throughout the country, not only were the technical men not in close enough touch with specific working samples and processing equipment, but they also found it difficult to show production departments how products could be better handled on processing lines or how new technics could be adopted. These technicians were also handicapped because they had little day-to-day working knowledge of the production problems. Production men were not always available when the research workers wished to consult with them.

GF's Research Constantly Works To—

■ **Improve products by making them better, more convenient, and less costly.** Examples include better flavors for desserts, pectin products with longer shelf-life, and cereals with greater consumer acceptance.

■ **Develop new products.** Prime illustrations are Minute Rice, frozen orange juice, Swans Down Instant Cake Mix, and Instant Maxwell House Coffee. It is notable that in 1948 alone sales of new products introduced since 1946 totaled $21,600,000.

■ **Protect foods through use of better packages to retain product quality, prolong shelf-life, and increase sales.** For instance, Post's cereals have been completely repackaged to give the necessary moisture protection.

■ **Discover new and better raw materials.** GF applies them in its products to raise quality and lower manufacturing costs. Several more economic ingredients were substituted in cereals to lower costs and at the same time to improve appearance, texture, and taste.

■ **Find valuable uses for by-products.** For example, by-products, of other manufacturing processes were developed for employment in improving Gaines Dog Food in appearance and nutritional value, while at the same time lowering its costs.

Research Decentrallized

How to get more out of research, in the light of these problems facing Central Laboratories, was next studied. And in the early '40s there came the third change—decentralization of a significant part of the company's research activities. This meant assigning to Central Laboratories those problems that called for group activities of highly skilled personnel, such as microscopists, biologists, bacterologists, engineers, organic chemists, and packaging technologists. It also meant strengthening the research in many of the plant laboratories where investigations could be made on production and materials problems, and where product specialists could be trained and could work with most efficiency.

Those divisions now containing laboratories are: Walter Baker, and General Seafoods, Boston; Franklin Baker, Hoboken; Post Cereals, Battle Creek; Bireley, Hollywood, Calif.; Atlantic Gelatin, Woburn, Mass.; Igleheart Brothers, Evansville, Ind.; Birds Eye-Snider, Albion, N. Y. and Hillsboro, Ore.; Gaines, Kankakee, Ill.; and Diamond Crystal, St. Clair, Mich.

In line with the creation of strong plant research groups, a staff was formed to coordinate all research activities to assist the company in getting the most out of the research dollars spent.

Heading up the new corporate research office is the director of research and development and his staff of four assistants in the New York City general offices. The director has line supervision over Central Laboratories and service responsibility for the division laboratories—the latter reporting directly to their division general managers. The director reports to top management, from whom he receives decisions on problems and policies pertaining to company-wide research.

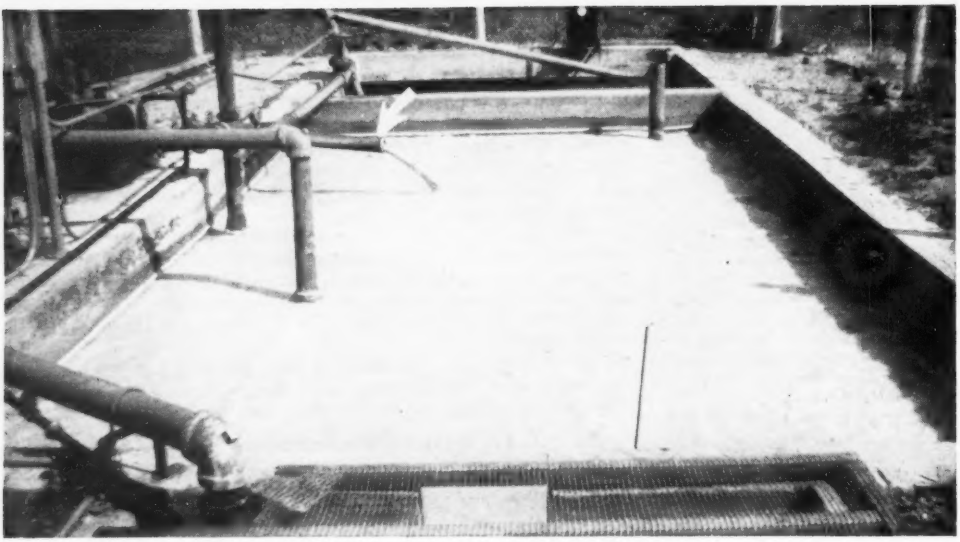
With the aid of his staff of four technically trained research assistants, who constantly contact the various laboratories and all divisions, the director critically reviews all research programs and co-ordinates the activities of all the groups conducting investigations. To a large extent, he determines from a corporate viewpoint, what research is needed, whether it is carried out adequately and efficiently, and whether projects receive the proper priority. He also makes sure that research activities are not duplicated by the various laboratories and that all divisions are informed of the research findings. The director keeps management informed on research activities, and research informed on management actions.

How Research Is Assigned

Most research projects involving Central Laboratories get a formal authorization at semi-annual project meetings held in Hoboken. Attending these meetings are the director of research and development and his staff, manager and heads of the six divisions of Central Laboratories, and general managers and laboratory managers from the different plant divisions.

The importance of operating management's participation in the development of research programs cannot be over-estimated. A great deal of

(*Turn to page* 223)



TANK in operation. Raw wastes and tank liquor from sump (under screen foreground), are mixed with compressed air in jets at bottom of tank. Some sludge is returned (arrow) from settling tank (rear).

Aeration Gives Low-Cost Waste Disposal

New treatment plant reported easier on budget and man-hours than trickling filter or activated sludge systems. BOD of milk wastes cut as much as 97 percent

WM. A. HASFURTHER
Sanitary Engineer,
Illinois Sanitary Water Board

Milk plant wastes may be economically treated in aeration-type equipment to give an effluent that can be safely discharged into streams.

Such an installation does not require a full-time attendant. But as with all industrial-treatment plants, general supervision should be provided by a responsible member of the company. Maintenance of pumping equipment, occasional disposal of settled solids, and daily laboratory checks for suspended solids, pH, and dissolved oxygen will suffice.

In this article, an actual aeration treatment plant is described, and results of its operation on wastes from a 200,000-lb. milk bottling plant are given. Particular attention is given to the need for care in design of air diffusers and tanks—vital if high efficiency is to be attained.

Solution of the milk processing plants waste disposal problem cannot be considered satisfactory until treatment units are economically constructed and operated without constant attention by skilled operators. In the past, much pollution was overlooked, many farmers and local residents accepting it as the price for having an industry locate in the vicinity and improve the local economy.

With the passage of stronger pollution-control laws, increased activity by control agencies, and the added attention given to stream quality by sportsmen and civic-minded groups, municipalities and industries are rapidly being forced to decrease the quantity of objectionable wastes discharged into streams. The demand for clean streams will keep growing, and unless industry finds more economical methods to control processing wastes, excessive sums will continue to be spent for treatment plants.

For years the trickling-filter plant was considered by many to be the solution to the milk waste problem, especially after means were developed to operate it at high loadings. Even then the cost of construction was more than a small milk plant could afford. Also, the activated sludge process was used occasionally, but it was limited to larger operations because of the need for a more skilled, full-time operator.

By varying the loading, a trickling-filter plant can be made to operate over a wide range of efficiencies, but a true activated sludge plant must operate at a high efficiency or upsets will occur. There was thus a need for an inexpensive plant which could operate at a moderate cost and over a wide range of efficiencies. Experience with aeration plants indicates that they may answer this need.

Trial Plants Built

During the past few years, three aeration treatment plants have been constructed in Illinois, and after making improvements in the original design and equipment, their performance is now considered satisfactory.

This discussion deals principally with construction and results obtained at the treatment plant built for Dean Milk Co. at Huntley, Ill. The milk bottling plant discharges wastes to a small creek with a fairly consistent dry weather flow. For a mile below

the point of discharge, this stream does not come near any homes, and is not accessible to cattle. It was felt, therefore, that a plant capable of reducing the oxygen demand of the wastes by 50 to 60 percent would be satisfactory.

The plant has a present capacity of about 200,000 lb. daily intake and packages whole milk in 1-qt. paper containers. Most of the milk is received in cans, although some is shipped in by tank truck. Occasionally, some is also shipped from the plant by tank truck. Exceptionally good care is taken to control losses. Computations, based on the raw waste, show losses, including those incurred in receiving, ranging from 0.5 to 1 percent, with an average of about 0.7 percent. Equipment is well-maintained. Tanks, piping and other equipment are drained before washing, and can-washer drip and prerinse, also some bottling machine drip, are collected and disposed of separately. Discharge is fairly constant, except on week-ends and holdays.

How It's Laid Out

The waste treatment plant was originally planned to use a moderate amount of air in a relatively shallow tank, with no thought being given toward development of activated sludge. However, design was such that the units could be readily incorporated into a trickling-filter-type plant if aeration failed to produce the expected results.

When the plant was placed in operation early in 1949, it was found that an activated floc, although poor, formed, even when low quantities of air were used. Because of the lack of good diffusion and recirculation, the plant upset regularly. Therefore, changes were made in the aeration equipment, in the recirculation of the aeration tank contents, and in the settling tank (see accompanying illustration). Baxter, Nelson & Woodman, the engineers, who designed the plant to conform to the desires of the Dean Milk Co., have continued to work with the company and with the Sanitary Water Board to improve the design and operation.

How It Operates

Wastes discharge to a trapped manhole, where paraffin from the bottling machines is removed. Then they go through a weir box—where flow is measured and samples are taken—and next continue to a collecting sump. A screen in the weir channel removes paraffin escaping the manhole. Raw wastes and recirculated aeration tank liquor are pumped from the sump through the aeration equipment. A small amount of compressed air discharges into the sump and helps reduce undesirable scum formation.

The aeration tank is 20.5 ft. by 11 ft. by 8 ft. deep, with a capacity of 1,804 cu. ft. or 13,500 gal. Jet-type aerators, in which a water pump mixes the waste with air, are located at the bottom of the tank. Walker Process impingement jets were originally installed. But when it became necessary (in January 1950) to drain and clean the aeration tank, these were replaced with American Well Works jets for comparative purposes. The latter are still in use and no clogging has been evident. The water pump has a capacity of 150 gpm., and the air compressor operates at 82 cu. ft. per min. Only 70.5 cu. ft. of air is utilized in the tank, the remainder being employed for return of sludge from the settling tank and for agitation in the sump (when it is not lost through the pressure relief valve).

Liquor from the aeration tank is returned to the collecting sump through a pipe, the rate being controlled by a butterfly valve. Sufficient flow must be returned to keep the pump suction submerged and to provide an adequate supply. During the dairy-operating period, about six parts of aeration tank liquor are returned to the sump for each part of raw waste. This repeated return is necessary for adequate absorption of oxygen.

A settling tank, which is 8 ft. by 11 ft. by 4 in. deep and has an effective capacity of 2,100 gal., follows the aeration tank. The two tanks are connected by ports. These are carefully baffled to prevent the transmission of currents from the aeration tank. Outlet is over a weir with a skimming baffle before it. This is necessary, since a thick scum readily collects on the liquid's surface.

By means of an air lift, sludge is returned to the aeration tank at a fairly steady rate. There is no measuring device or proportioning box such as is used in activated sludge plants. No facilities were provided for disposing of waste sludge and this problem is still being studied.

Sample Collection

V-notch weirs are installed at the inlet to the collecting sump and in the effluent channel. An automatic sampler was installed at the inlet weir channel and a recording meter was also placed at the inlet weir when Sanitary Water Board samples were obtained to study raw flow fluctuations. Raw samples were collected every five or ten minutes and effluent samples were taken every half hour by the Sanitary Water Board during its tests. Dean Co. personnel collect effluent samples every hour when they make tests. Samples are proportioned according to the measured flow and composited over the sampling period.

Figuring Plant Needs

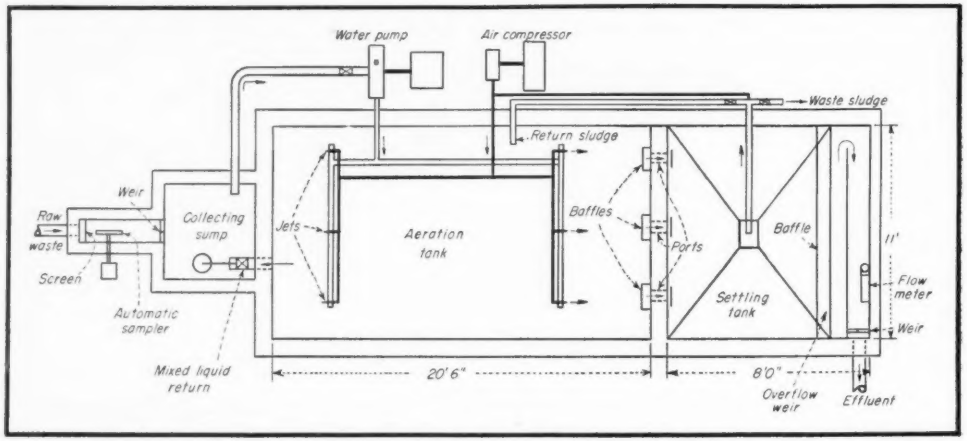
To understand the polluting effect of waste materials, or the operation of a treatment plant, something must be known of the nature of the waste and the method for measuring its strength. When organic material such as milk is discharged to waters containing oxygen, all or part of the oxygen is used during decomposition of the waste. This decomposition is accomplished by bacteria and other microorganisms which consume the organic material and utilize oxygen in proportion to their activity.

The strength of a waste is commonly expressed in terms of the 5-day biochemical oxygen demand (BOD) which is a measure of the oxygen required for stabilization of the organic material. The test requires five days of

6 Tips From Dean Plant Operation

- **Not every type of air diffusion will work, and the amount of air introduced means little if diffusion is not good. This is a critical point in the design of such a plant. In conjunction with this a slightly deeper aeration is desirable.**
- **With an aeration tank having a capacity of nearly one day's flow and using jet-type aerators, approximately 1,100 cu. ft of air should be provided per pound of biochemical-oxygen demand constituents in the raw waste. Consideration must be given to periods of concentrated loading.**
- **There should be careful attention to removal of the activated floc in a final settling tank. Good baffling and settling characteristics must be obtained.**
- **Regular facilities for disposing of sludge are not needed. Most of the solids are "burned up" in the treatment process. And unless the plant is a very large one, waste sludge can be partially dewatered and disposed on the ground or in pits where it will cause no nuisance.**
- **Careful attention must be paid to the plant, but satisfactory operation can be maintained by determining the suspended-solids content daily with an ordinary dairy centrifuge and making checks on the pH and dissolved-oxygen content of the liquor in the aerator basin.**
- **Provision should be made for measuring flow and collecting weighted samples. This not only will show what the treatment plant is doing but also will provide a record of dairy plant losses.**

Drawing Board Perspective



LAYOUT of aeration plant at Dean Milk Co., Huntley, Ill., where wastes from 200,000 lb. milk received daily are successfully treated to give effluent low in objectionable organic matter.

incubation under controlled conditions and results are reported in parts per million of oxygen consumed. From this figure, and the flow, the pounds of BOD constituents can be calculated for use in determining plant losses or treatment required.

It has been found that strictly domestic sewage contains approximately 0.167 lb. of 5-day BOD per day per person contributing. This figure is commonly used to compare industrial wastes with domestic sewage. Thus, the 103 lb. of BOD discharged in the raw wastes on Oct. 4, 1949 (Table I) is equivalent to the domestic sewage from approximately 617 persons.

Operations Checked

Tests were made, early in 1949, with eight old-style jets and with compressor discharge varying from 34 to 72 cfm. Air dispersion was not good and became worse as more air was applied, the best reduction in strength occurring at the lowest rate. BOD reductions ranged from 71 to 78 percent at the lowest rate of air application, but the plant became completely upset shortly after the test was made, and this condition occurred frequently as further treatment was attempted.

Since the measured aerator loading during these tests was approximately the same as used in domestic treatment design, it was evident that a better method of dispersion was required. Microscopic examination of the aeration tank contents (commonly called mixed liquor) showed an absence of organisms found in activated sludge but a number of the type usually found in polluted waters devoid of oxygen. During the summer, therefore, an improved jet was substituted, along with six additional units.

About this same time there was constructed another milk waste treatment plant, with a greater aeration tank detention and an equivalent quantity of air per pound of BOD, with air introduced through perforated pipes. The openings clogged rapidly, even when the holes were increased to $\frac{1}{8}$-in. dia., and there was little reduction in the polluting effect of the waste. Chicago Pump Co. diffuser tubes are now being used at the Dean plant, and, although clogging still occurs, the units can be removed individually for cleaning, and satisfactory reductions are being obtained.

Changes Help Aeration

With the addition of the improved Walker jets, the Dean plant was put back in operation, and after it had run without trouble under full load for two weeks, a 3-day test was made. This was in Oct. 1949 (see Table I). Good efficiencies were obtained, although a turbid effluent on the third day reduced over-all reduction to 69 percent. BOD loading for the period averaged approximately 1 lb. per 18 cu. ft. of aeration tank capacity, and an average of 1,050 cu. ft. of air was supplied per pound of BOD.

Two tests were taken a month later by the Sanitary Water Board. These showed reductions of 54 and 89 percent. Later tests by the Dean Co. staff showed—even with restricted raw loadings—that most of the jets were clogged, this presumably hindering effective aeration. The jets were then removed and replaced with six American Well Works jets, and all results for 1950 are for these units.

Tests during 1950 show no improvement in the BOD reduction or dissolved oxygen content of the liquor in the aeration tank, when compared to previous periods in September and October of 1949 when the jets were not clogged. However, the activated floc had a better appearance, and all upsets due to decreased aeration efficiency resulting from clogged jets have been eliminated. It is still impossible to find all the species of organisms associated with activated sludge, but all examinations made since the improved jets were installed show organisms of the type found in cleaner waters rather than those found in polluted waters.

Reference to Table I shows that the average flow during the 8½-10-hr. sampling period was about 11,200 gal. or 21 gpm. This gives average detentions in the aeration tank of approximately 10.7 hr. and in the settling tank of 1.67 hr. At the average 24-hr. flow (15,200 gal.), detention periods are 21 hr. for the aeration tank and 3.3 hr. for the final tank.

BOD reductions during the Sanitary Water Board tests ranged from 66.7 to 97.3 percent. These vary more with the condition of the activated floc than with the load. If a fairly heavy and dark tan-colored floc is maintained, the efficiency will vary little even for days of abnormal loading. But if the floc becomes fluffy and light, efficiency is greatly reduced. The fluffy floc settles poorly and much carries over, with samples of effluent during such periods showing BOD's nearly as high as the raw waste.

Some floc is normally carried over,

Down Came the BOD

TABLE I—GOOD AERATION Produced Efficient BOD Reductions. Analyses by Sanitary Water Board

Date	Sample	Flow in Gal. Sample Period*	Flow in Gal. 24-Hours	Milk Received Lb.	Milk Bottled Lb.	pH	Suspended Total Solids Ppm.	5-Day BOD Ppm.	BOD Lb.	BOD Reduction Percent	Air Per Lb. BOD Cu. Ft.
10- 4-49	Raw	12,600	19,800	129,900	123,434	7.5	370	930	98		455
	Final	11,000				7.9	33	25	2.3	97.3	
	Raw (night)	7,200					220	85	5		
	Raw (24-hr.)	19,800							103		1,070
10- 5-49	Raw	11,000	13,900	129,700	119,400	7.4	280	960	88		500
	Final	11,000				7.7	40	55	5	94.3	
	Raw (night)	2,900				9.3	250	288	7		
	Raw (24-hr.)	13,900							95		1,160
10- 6-49	Raw	13,500		185,488	145,508	7.9	250	1,010	114		384
	Final	13,500				7.4	440	315	35	69.0	
	Raw (Total) (est.)								120		925
4-17-50	Raw	8,600	12,200	124,481	104,177	7.4	270	670	48		770
	Final	8,600				7.5	100	90	6.5	86.5	
4-18-50	Raw (aft.)	4,900	14,400	123,218	109,193	6.9	200	790	32		330
	Effluent	10,500				7.3	920	450	39	86.8	
	Raw (night)	3,900				8.1	120	270	8.8		7,000
4-19-50	Raw (morn.)	4,770		124,517	101,695	7.0	1,060	930	37		510
	Raw (aft.)	6,600				7.1	270	720	40		
	Effluent	11,370				7.4	440	260	24.6	68.0	
	Raw (Total)								83		1,220
5- 3-50	Raw	13,300	15,900	121,779	100,500	6.2	670	1,260	140		300
	Effluent	13,300				7.1	105	120	13	93.5	
	Raw (night)	2,600				8.7	310	300	6.5		9,100
	Raw (Total)	15,900							146.5		690
5- 4-50	Raw	12,600		120,379	144,050	6.0	500	1,090	115		370
	Effluent	12,600				7.3	310	240	25	78.0	
	Raw (Total)								121		840
6- 2-50	Raw	11,000	19,300	139,000	146,000	6.6	280	870	80.4		500
	Effluent	11,000				7.2	160	290	26.6	66.7	
	Raw (Total)	19,300							87 (est.)		1,170
8- 2-50	Raw	6,800	11,100	112,000	114,000	7.8	440	1,000	57		613
	Effluent	6,800				7.1	150	80	4.5	92	
	Raw (Total)	11,100							65		1,560

* Sample periods during operation ranged from 8.5 to 10 hr.

and the Dean laboratory, under the direction of Dr. J. H. Hetrick, has centrifuged ten effluent composites to remove the floc, and by so doing decreased the BOD from approximately 286 ppm. to 89 ppm. Much of the difficulty of floc carryover was due to raw-waste-flow surges which were transmitted through the final tank. Improvements were made in baffling the ports between the aerator and final tanks, the last being in June 1950. Since then the suspended-solids content of the effluent, which is a measure of the floc carry-over, has been materially reduced.

We have run dissolved oxygen determinations in the mixed liquor hourly during test periods and find that, for most of the operating day, the content varies from 0.0 to 0.3 ppm. Recirculation of the wastes during the night, when there is little raw load, results in an oxygen content in the tank by morning of from 0.5 to 2 ppm. The aeration equipment is continuously operated at capacity.

Earlier plant control was based on the settleability test of the sludge. But lately a centrifuge test has been used. It was found that, when the solids concentration in the aeration tank was between 3 and 3.5 percent, optimum conditions for BOD reduction could be expected. In this range, suspended-solids content of the mixed liquor was found to vary from 3,200 to 4,500 ppm. When the concentration goes over 4 percent, some final-tank sludge is usually wasted.

TABLE II—DEAN MILK CO. RESULTS Substantiate Those of Sanitary Water Board

Date 1950	Sample	Flow During Sample Period, Gal.	5-Day BOD	5-Day BOD, Lb.	BOD Reduction Percent
2-21	Raw	8,730	1,075	78	
	Effluent	8,730	130	9.4	88
5-10	Raw	17,976	1,610	240	
	Effluent	17,976	465	69	71
5-15	Raw	17,142	1,310	186	
	Effluent	17,142	60	8.5	95
5-18	Raw	15,648	1,475	192	
	Effluent	15,648	260	34	82
5-24	Raw	11,250	910	84	
	Effluent	11,250	490	46	46
6-14	Raw	12,609	1,085	114	
	Effluent	12,609	300	31	72
6-21	Raw	10,836	1,565	140	
	Effluent	10,836	465	41	70
6-29	Raw	9,159	580	44	
	Effluent	9,159	120	9	80
7-6	Raw	13,224	760	83	
	Effluent	13,224	265	29	65
7-12	Raw	12,120	710	71	
	Effluent	12,120	290	29	59
7-20	Raw	14,667	815	99	
	Effluent	14,667	280	34	66
7-27	Raw	14,418	885	105	
	Effluent	14,418	130	16	85
8-17	Raw	27,240	650	146	
	Effluent	27,240	200	45	69
8-18	Raw	26,832	770	171	
	Effluent	26,832	185	41	76

Laboratory results obtained by the Dean Milk Co. laboratory (Table II) were similar to those obtained by the Sanitary Water Board.

INCREASES in consumption of "rich" baked goods broaden outlets for the necessary materials.

Trends Bring Shifts in Baking Ingredients

Use of milk products, fats, eggs, and sugar are on rise both in proportion to flour and in total utilization. Span from '23 to '47 evaluated

ALLEN B. PAUL
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The U. S. baking industry is a large market for agricultural products. Nearly $1,500,000,000 were paid for ingredients in 1947, principally for flour, sugar, fats, milk products, eggs, fruits, nuts, yeast, malt extract, and flavorings.

Accordingly, changes in the nature of this market should be of interest to producers and processors of wheat, corn, barley, sugar beets, sugar cane, hogs, soybeans, cottonseed, milk, eggs and other farm products.

Although the formulas for different kinds of bakery products vary widely, the composite formula of the bakery industry indicates something about the market for the different ingredients. Flour comprises over three-quarters of the weight of total ingredients, exclusive of water, in most years. Other major ingredients are, in order of importance: sugar, fat, milk products, eggs.

A significant long-term trend in ingredient usage, prior to the last war, was the increase of non-flour ingredients relative to flour. In 1923 the composite bakery formula consisted of 5 parts flour to 1 part non-flour ingredients; in 1939, the formula was more nearly 3½ to 1. The increase was mostly in the use of sugar, fat, and powdered milk. Consumers increased purchases of pastries, cookies, etc., relative to bread; also, the "richness" of formulas probably increased.

War Shortages

But a relapse occurred in the war period when supplies of fats, sugar, and dried milk had to be conserved. Bakers learned how to economize on these ingredients in their formulations and manufacture. With supplies of sugar, fats and milk again becoming available in large volume and at lower cost, their use relative to flour has been increasing. The only composite postwar picture available is for 1947, when recovery was not complete. Even so, the use of sugar, fats, and dried milk compares favorably with most prewar years.

The Bakery Industry as a Market

How important is the bakery industry as a market for flour, sugar, eggs, milk, and fats? For some products it is the major outlet, for others, it is comparatively small. In Table II are shown estimates of the domestic disappearance of the major bakery product ingredients: (a) In all uses, and (b) in commercial bakery uses. In 1937, bakers used roughly three-fifths of all the flour, frozen eggs, and dried milk produced, about one-sixth of the fats, and one-ninth of the sugar.

Among the fats, greatest use was made of shortenings and lard—between one-quarter and one-third of the shortening and about one-quarter of the lard. Less than 5 percent of all other fats were used in baked goods.

The bakery industry is an expanding market. Even though the role of flour in the composite formula has declined in the 1923-47 period, its use

in bakery products increased 67 percent. Sugar increased 128 percent, eggs 100 percent, powdered milk 760 percent, and fats 136 percent. These increases compare with an increase in total population of only 28 percent during the same period.

Relative importance of the bakery industry as a market for a product depends on the relationship of the quantity used in commercial baking to the quantity devoted to other uses. In the 25-year period under review, domestic markets, other than commercial baking, declined markedly for flour, but increased for sugar, dry milk, canned milk, and shortening. Such markets held relatively steady for lard. In the case of shortenings, the large increase came in the '20s and held fairly steady thereafter.

Thus, the increased use of flour in commercial baking, and decreased use elsewhere caused the relative importance of the bakery market to rise greatly. Similarly, failure of other domestic markets for lard and shortening to expand caused an appreciable climb in the importance of the bakery market for such fats.

Synthetic Emulsifiers and Fats

There is much concern over the possible displacement of lard and shortenings by chemical emulsifiers (so-called "bread softeners") in baked goods. Several million pounds of such chemical substances have been sold to bakers in the past few years, and claims have been made to the effect that 1 lb. of such chemicals will replace 4 to 5 lb. of fats in bakery goods.

Some people believe that a substantial inroad on the bakery market for fats has already been made, and that this contributed to the sharp decline in prices of fats and oils in the past year.

Adequate data are not available to test the validity of these views. We need to have more complete knowledge of changes that have occurred in bakery formulas and the real reasons for these changes. The increase in sales of emulsifiers does not necessarily mean that fats are thereby displaced. And if fat usage has declined, it may have been for other reasons. In other words, emulsifiers are but one of several factors that determine the level of fats used in baked goods.

Some bakers felt that in the immediate prewar years the industry was using more fats than necessary for the best type of products. The rationing of fats during the war suddenly reversed this situation, and bakers had to learn to produce satisfactory products with less than the usual quantities of fats. In other words, economizing technics were pressed upon the industry before the supplementary emulsifiers were widely prevalent.

In the immediate postwar years, fats were extremely high in price, which in itself would appear to discourage their use. Yet the use of fats in formulas increased substantially from their wartime lows. Bakers have found it desirable to keep the fat level of their product up, quite apart from the inclusion of emulsifiers.

It is highly doubtful that the sharp break in prices of fats and oils was due in any significant way to the displacement of fats by emulsifiers. The break was too sharp and too great to reasonably be assigned to a technological change that has only begun to become evident. More important were other factors, such as the large increase in domestic supplies of fats and oils, and possibly the greatly increased sale of synthetic detergents.

It is possible that such emulsifiers as are finally permitted by F&DA standards will somewhat affect the future markets for fats. Limits to such displacement, however, will be set by the consumer, who will make felt his wish for bakery products with desired eating qualities. This will be the real test. In the meantime, producers of fats can take encouragement from the record of the bakery industry. Despite the extremely high prices of fats in 1947, bakers used 8.0 lb. of fat per 100 lb. of flour. Except for one year when 8.2 lb. were used, this was higher than any previous year on record. This probably represents increased fat levels in formulas, and relatively greater output of products with relatively high fat content (e.g., cake versus bread). In any case, it shows a healthy condition in the fats market in the face of extremely high prices for fats and availability of chemical emulsifiers.

Formula Figures and Data on Utilization

TABLE I—Composite Formulas of U. S. Commercial Bakery Products, 1923-1947

	1923	1925	1927	1929	1931	1935	1937	1939	1947
				(parts by weight)					
Flour (basis)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Sugar	9.4	9.9	10.4	11.6	11.0	12.2	13.0	13.6	12.9
Eggs	1.7	N.A.*	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	2.0
Milk, powdered	.4	.5	.7	.9	1.0	1.3	1.6	1.8	2.3
Milk, canned	1.8	1.9	2.0	2.1	1.8	1.6	2.1	1.8	N.A.
Milk, fluid	1.5	1.1	1.0	1.3	1.3	1.6	1.5	1.5	N.A.
Fats (fat equivalent)	5.6	5.7	5.8	6.6	6.6	7.0	7.6	8.2	8.0
Malt extract	N.A.	.6	.6	.6	.6	.6	N.A.	.4	N.A.
Yeast	1.2	1.2	1.3	1.3	1.4	1.4	1.6	1.6	N.A.

Source: Based on data in Census of Manufacturers.
* N.A. means data not available.

TABLE II—Estimated U. S. Utilization of Selected Products in All Uses, and in Commercial Bakery Uses, Selected Years.

Product		Million Pounds				Percentage in Baking			
		1923	1929	1939	1947	1923	1929	1939	1947
Flour	Total[a]	20,100	21,300	20,300	19,800				
	Bakery	7,401	9,271	9,393	12,336	36.8	43.5	46.3	62.3
Sugar	Total[b]	10,658	12,700	13,636	13,984				
	Bakery	698	1,075	1,281	1,590	6.5	8.5	9.4	11.4
Eggs, frozen	Total	.....	.....	.....	427[c]				
	Bakery	.....	.....	.....	250	N.A.*	N.A.	N.A.	58.5
Milk, dry skim	Total[d]	41	133	285	417				
	Bakery	33	80	172	284	81.5	60.2	60.4	68.1
Milk, canned	Total	1,282	1,657	2,327	2,915				
	Bakery	134	190	173	N.A.	10.5	11.5	7.4	N.A.
Fats, total	Total[e]	4,674	5,415	6,067	6,006				
	Bakery	416	608	767	980	8.9	11.2	12.6	16.3
Lard	Total	1,605	1,552	1,662	1,817				
	Bakery	271	279	290	446	16.9	18.0	17.4	24.5
Short-ening	Total	734	1,204	1,390	1,337				
	Bakery	118	285	420	401	16.1	23.7	30.2	30.0
Other fat	Total	2,335	2,659	3,015	2,852				
	Bakery	27	44	57	133	1.2	1.7	1.9	4.7

Source: Total disappearance figures based primarily on U. S. D. A. Mis. Publ. 691. Bakery figures based on *Census of Manufactures.*

[a] Wheat and rye flour.
[b] Cane, beet, and corn sugar (refined basis). Corn sugar data from *Census of Manufactures* and U. S. Tariff Commission Report No. 138.
[c] 1947 production. *Census of Manufactures.*
[d] For human food only.
[e] Fat equivalent basis.
* N.A. means data not available.

TABLE III—Estimated Utilization of Selected Products in Domestic Uses Other than Commercial Baking

	1923	1929	1939	1947
	(billion pounds)			
Flour	12.70	12.03	10.91	7.46
Sugar	9.96	11.62	12.36	12.39
Dry Milk	.01	.05	.11	.13
Canned Milk	1.16	1.47	2.15	N.A.*
Lard	1.33	1.27	1.37	1.37
Shortening	.62	.92	.97	.94

Source: Derived from Table I.
* N.A. means data not available.

* Emulsifiers were incorporated in shortenings for bakers in the early 30's (see A. E. Bailey, *Industrial Oil and Fat Products*, 1945). To get the proper emulsification effects in cakes, a substantial increase in the shortening content of the formulas are needed (see results reported by N. F. Johnston and H. H. Favor, "New Emulsifiers for Foods," *Food Industries*, Vol. 19, pp. 1196-97).

In three easy steps lamp and reflector are removed for fast cleaning →

The How, When, and Why of

PLANNED LIGHTING MAINTENANCE

It saves dollars in better operations, reduced spoilage, fewer accidents

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Division Engineer,
Sylvania Electric Products, Inc., Cleveland

Lighting equipment, be it fluorescent or incandescent, depreciates so gradually, so unnoticeably, so silently, that it frequently doesn't receive the maintenance attention it deserves. Unfortunately, outright failure is too often the only spur to action.

Yet, a lighting system in tip-top shape is one of the essential tools of production. It pays for itself many times over in better quality, increased production, reduced spoilage, fewer accidents, and less labor turnover—simply by making "seeing" conditions comfortable so that employees, subconsciously, are more cheerful and satisfied, more efficient and dependable. ■ **You may already have a planned lighting maintenance program in your plant. If so, check the following for ideas to make that good program better. If not, start projecting a planned program as described. It may well save you a great many dollars.**

Even in the food industry, where cleanliness is next to godliness, lamps and lighting equipment pick up an increasingly heavy layer of dust and dirt. This is because a building will "breathe" as atmospheric changes occur. The accumulations also take place, to a certain extent, in air conditioned areas where circulated air is cleaned. Dust and dirt, released by clothing, are carried by air currents to the warm surfaces of lighting equipment. All this can result in lighting efficiency being decreased as much as 30 percent.

Now add the fact that light output of lamps gradually depreciates during lamp life. At the end of rated lamp life, the reduction usually amounts to about 20 percent. Dark colors on ceilings, walls or work surfaces, particularly if covered with an accumulation of airborne dust or dirt, may be the cause of an additional 10 percent loss, besides leading to uncomfortable seeing conditions. Failure to note and replace lamps that have failed reduces illumination still further. How these losses can total up is shown graphically in Fig. 1—a picture of conditions found in one industrial plant before a planned maintenance program was adopted.

Different Programs Described

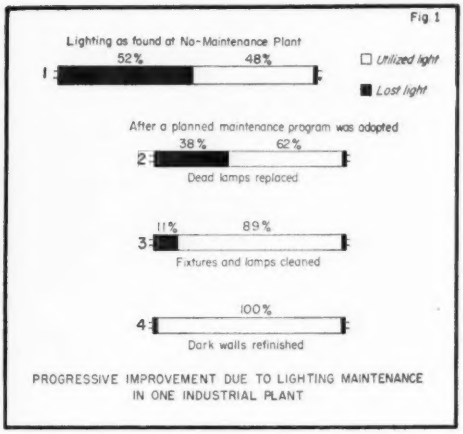
Two general methods of planned lighting maintenance are in extensive use today. They both involve periodic cleaning of equipment. Difference lies in the manner of lamp replacement. One scheme calls for replacing of *individual* lamps as required, the other for *group* lamp replacements before *the end of rated life.*

The method you adopt should be determined by a cost analysis of both systems, together with consideration of any variations in your particular operation. But it is interesting to note that most organizations specializing in lighting maintenance employ the second method. Since their business success depends entirely on operating economy, and because they are concerned with many types and sizes of lighting equipment of various makes, their experience should prove of value to you.

The lighting experts have found the factors guiding your decision on a system to be: Type, design, and quality of lighting equipment; type and quality of light sources; accessibility of equipment for maintenance; and availability of equipment for cleaning and lamp replacement. In practically all cases, *periodic* cleaning of equipment is more economical, particularly in comparatively large installations where accessibility and availability of equipment are limitations.

Again on replacement: Some of you may find it most feasible to replace lamps individually as they fail, on the principle that it is uneconomical to replace a lamp before it fails.

Is your plant in Condition 1 or 4?



This is particularly true if (1) most of your lamps are incandescent, such units having relatively short rated life, or if (2) your installation includes lamps of different life ratings.

On the other hand, you may decide on an elaborate dating-system method in which all lamps marked prior to a specified date are discarded during each periodic fixture cleaning, lamps failing in the interim being replaced individually.

Or, you may find that the common group replacement of lamps is the most economical method. Here the lamps replacement periods would coincide with equipment cleaning periods so that no additional labor is required —the work of discarding an old lamp and substituting a new one is about the same as for cleaning the old one. The few lamps that fail between group replacement may be replaced individually, or not until the next group replacement. This depends on the reduction in illumination and whether uniformity of illumination and appearance are important factors in good housekeeping.

Group lamp replacement is not restricted to any particular type of light source, though analyses show that economy is greatest with lamps of relatively long life, such as fluorescent or high-pressure mercury vapor lamps. Lamp quality is an important consideration, too, because of greater uniformity of life, as well as greater uniformity of light output, color, appearance and general performance

Details on Group Plan

A group replacement plan designed primarily for, but not necessarily restricted to, fluorescent lamp installations is known as the Budget Reduction Plan. It is based on the following factors:

1. Labor costs in general are high.

2. Labor costs are considerably greater for individual lamp replacements than for replacement of lamps all at one time.

3. High quality fluorescent lamps, less than 5 percent of which will fail within 5,000 hr. under normal operating conditions, are available at standard prices.

4. The lamp replacement schedule can coincide with one of the regular cleaning periods during a 5,000-hr. operating period (about 2 years on the basis of 10 hr. per working day) to effect even greater economy.

We will now explain how the plan works, in terms of an installation of 1,000 lamps for the sake of simplicity. Being on a per-1,000 basis the results can be applied to an installation of any size.

A. First comes determination of the labor costs of replacing fluorescent lamps on an individual basis. Though they vary over a wide range, let's say $1.00 per lamp is the average cost. Then replacement of 1,000 lamps individually as they fail comes to $1,000.

B. Time study tests indicate that two men can replace 1,000 lamps in four 8-hr. days. At an average wage of $12 per man per day, the cost of group replacing 1,000 lamps is 4 x 2 x $12 or $96.

C. Assuming that a full 5 percent (or 50) of the lamps will fail prior to 5,000 hr., and that they are replaced individually, (see "A" above), the lamps, assuming 75c. for the 40w. fluorescent lamp, will cost 50 x $.75 or $37.50, and the labor for replacement 50 x $1.00 or $50, making a total of $87.50.

D. Using an operating period of 15,000 hr. to put the two methods on the same basis: 1. *Individual replacement* will require one set of 1,000 lamps at the expiration of each 7,500-hr. (average rated life) operating period at a cost of 2 x 1,000 x $.75 or $1,500 for lamps and 2 x $1,000 (from "A") or $2,000 a total of $3,500; 2. *Group replacement* will require one set of 1,000 lamps at end of each 5,090-hr. operating period, plus the labor of group replacing 1,000 lamps three times, plus the cost of lamps and labor for the 5 percent that are assumed to fail prior to 5,000 hr. The Budget Reduction Plan cost is 3 x 1,000 x $.75 or $2,250 for lamps plus 3 x $96 (from "B")or $288, plus 3 x $87.50 (from "C") or $262.50, a total of $2,800.50

E. The saving effected by the Budget Reduction Plan for the 15,000-hr. period is $699.50 ($3,500.00 minus $2,800.50) per 1,000 lamps, or $349.75 per 1,000 lamps for each 7,500-hr. operating period.

You are interested in savings of this magnitude, to be sure. If you find variance from the labor costs used in this analysis, or if your lamp cost is more or less than the figure used, you may substitute figures you feel more nearly conform with your type of operation. Even so, your answer is very likely to show high economies.

How Often to Maintain

The required frequency of lighting maintenance depends on the following: Rate of accumulation of dust and dirt; average life of lamps; maintenance method employed; and, in the case of new lighting equipment under consideration, type and design and quality of equipment.

For a new installation, or one that has been restored to maximum efficiency, frequency of cleaning can be determined by occasional illumination readings with a foot-candle meter at several important locations. When the illumination drops to about 25 percent of initial values, or of those after the last cleaning operation, cleaning of reflectors, lamps and shielding equipment usually results in greater economy. A record of illumination readings before and after each cleaning operation (assuming group cleaning where all fixtures in one area are cleaned at one time) is helpful in proving the economy of cleaning and in determining the rate of depreciation of equipment.

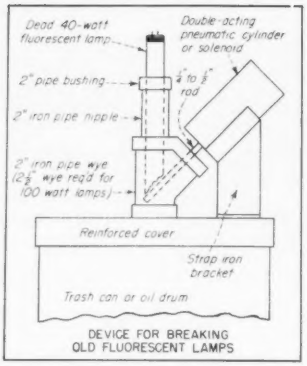
Planned maintenance usually can be accomplished more economically during shut-down periods. Although labor costs may be higher at this time, equipment required for maintenance work is more readily available, can be moved about more effectively, can be used when needed without interfering with production, and does not involve lost time in transit between the maintenance shop and lighting locations.

Equipment Necessary

Group cleaning of lighting equipment and group replacement of lamps require little, if any, additional maintenance equipment over what is ordinarily available in the plant. Where the mounting height of lighting equipment is comparatively low (15 ft. or less), the "apple picker" with a handle of suitable length is often used for replacing incandescent lamps when they are not in enclosed fixtures.

Sturdy stepladders of convenient heights are most frequently used for servicing enclosed incandescent and fluorescent equipment. A rolling stage that is adjustable in height and fitted with dolly wheels and a brake is sometimes preferred for fluorescent lighting installations since it permits the maintenance crew more latitude and often saves time. Lamp racks that hook or clamp to stepladder or stage are convenient and time-saving accessories for carrying new lamps and receiving old ones.

The aerial platform ladder is very practical for reaching equipment located in otherwise rather inaccessible places. It comes equipped with universal adjustments—for rotation around a pivot on the truck it is mounted on, for easy raising to any height, and for adjustment at various angles between horizontal and vertical. The aerial platform ladder is practical for heights of 30 ft. or more, where other types of ladders usually are unsafe, and scaffolds are impractical. Lighting equipment mounted relatively high (more than 25 ft.) is handled from cranes, catwalks, or from the floor by means of disconnecting type hangers.


Dead 40-watt fluorescent lamp
Double-acting pneumatic cylinder or solenoid
2" pipe bushing
2" iron pipe nipple
2" iron pipe wye (2½" wye reqd for 100 watt lamps)
¾ to ⅞ rod
Reinforced cover
Strap iron bracket
Trash can or oil drum
DEVICE FOR BREAKING OLD FLUORESCENT LAMPS

FLYING GLASS and dust are curbed if you break "dead ones" this way.

Usual cleaning equipment consists of a large pail (or portable tub) for water, a mild soap or a detergent that requires no rinsing, and several cloths for washing reflectors, wiping off excess moisture, and wiping dirt from the lamps. Some detergents are excellent for washing plastic parts of lighting fixtures to prevent accumulation of static electricity, which attracts fine dirt particles quite rapidly. If the plastic is immersed in the suds of detergents such as "Glim" or "Dreft", and air-dried without wiping, the static charge can be materially reduced.

Efficient Cleaning Procedure

Most of the better industrial lighting fixtures can be cleaned quickly with a few strokes of a cloth moistened with water in which detergent has been dissolved. Lamps ordinarily can be cleaned readily with a damp cloth. Incandescent lamps should be permitted to cool before moisture is applied to prevent cracking the bulbs. Louvers (egg-crate-type shields) often can be cleaned sufficiently with a dry brush. But if the dirt is sticky, swishing them up and down a few times in detergent and water may be necessary. To permit their drying sufficiently to prevent water damage from dripping, a few extra louvers are sometimes kept on hand, so the crew can finish each fixture before proceeding to the next.

The maintenance routine we will now describe has been shown by time studies in several plants to be the most economical. It may be applicable to your operation if you have interchangeable reflectors and shielding equipment that are relatively easy to remove from the fixtures. This routine requires a two-man team, though it may be modified for three men where the type of installation would lead to greater economy.

Step 1. Man on ladder removes lamps and reflector and passes them to the man on floor who, in turn, passes up a previously-cleaned reflector.

Step 2. Man on ladder installs previously-cleaned reflector while man on floor wipes off the lamps and hands them to man on ladder.

Step 3. Man on ladder puts lamps in place, sees that fixture is working properly then descends and puts ladder in place at next fixture. Meanwhile man on floor cleans the reflector from the first fixture and has it ready to replace the soiled reflector in the next fixture. Process is then repeated.

An occasional cleaning or refinishing of walls and ceilings will also aid materially in maintaining better lighting conditions.

New lighting equipment should be selected with ease of maintenance as one of the important considerations. Lamps, reflectors and shielding equipment should be readily removable without use of tools. All reflecting surfaces should be hard, smooth, and free of unnecessary obstructions to cleaning. They should be highly resistant to reasonable flexing, heat, and repeated cleanings, and should have a high initial and maintained reflectivity. Components should be of best quality to insure top lamp performance and a minimum of parts replacement. All parts should be protected from attack by adverse atmospheric conditions and should be designed to provide adequate safety.

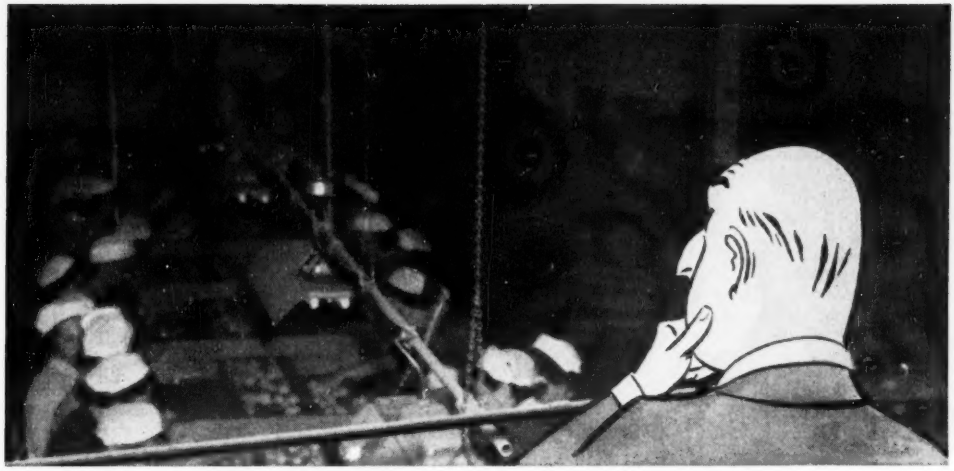
Disposal of Old Lamps

Lighting maintenance sometimes presents the problem of disposing of the old lamps, particularly where fairly sizable fluorescent lighting installations are concerned. Whether lamps are of the incandescent or fluorescent type, they ordinarily must be broken up to conserve space.

In breaking lamps of any type it is highly advisable to employ a closed container to avoid accidents from flying glass particles and dust. Incandescent lamps are broken safely in a container, such as an oil drum, in which a length of pipe is inserted, through a loose-fitting hole or bushing in the removable cover, to break the bulbs.

Fluorescent lamps can be broken by means of equipment which is available from manufacturers. Or a simple device, as illustrated in Fig. 2, might be made by your own men. It is to be noted that fluorescent lamps which were manufactured after June 1949 do not contain ingredients that might be toxic. However, it is suggested that those precautions taken against an excess of any dust, be exercised in the process of breaking fluorescent lamps. At

(*Turn to page* 219)



Come along on this "trip" through you own plant. It'll show you—

The Way to Foolproof Sanitation

Just be sure, as we go, that you really see everything, "raw to finished." For as top man, product purity is your Responsibility—with a capital "R"

J. CARL DAWSON

J. Carl Dawson & Associates,
Preventive Sanitation Consultants, St. Louis, Mo.

In organizing an effective food plant sanitation program it is first essential that you—the management—understand what the project is to accomplish. Failure to recognize the goal is most often responsible for failure of the program.

To bring out the prime points, an A-to-Z inspection of your plant is in order. And in this article we'll take you on such a trip. But let us begin by getting our definitions well in mind:

Perhaps the simplest approach in the thinking of management is to associate the sanitation program with the attainment of freedom from contamination of the product—purity of the product. Your finished goods must be free of foreign materials, especially those that are considered unpalatable. This freedom from contamination is required even though the product is sterilized by heat or other method. A product is unsanitary if contaminated, whether the dirt or contaminating substance is sterile or not. Sterilized dirt is not considered palatable either by the consumer or the law.

This line of reasoning brings us to consideration of a logical preventive program.

Initial objective is to determine the most common sources of contamination in order to know how to plan the preventive steps. These sources can be divided into two groups.

The first group—contamination by living things—covers such sources as the following:

1. Direct contamination by man through his unsanitary habits and practices.

2. Contamination by warm blooded animals, such as rats, mice, birds, cats, and dogs.

3. Contamination by (a) insects, mites, and related life, that live in and feed upon human food products; (b) flying insects, such as house flies, mosquitoes, moths, and in general all insects that may fly into the building.

4. Contamination by micro-organisms that, given favorable environment, will grow in the products, machines, utensils, and building itself.

The second group covers contamination by non-living things, which may be classified as common dirt or foreign matter:

1. Dust, dirt, fly-ash, etc., that may be in the air in the vicinity of the building.

2. Dust and dirt that may be tracked into the building on the feet of employees or carried into the building on packages, etc.

3. Dust and dirt that may develop in the plant as a result of handling materials and operating the plant.

Management Is Responsible

The next question should be, "Who is responsible for sanitation?" If the answer seems to be, "No one specifically", then the answer is wrong. Under the Federal Food, Drug & Cosmetic Act, and similar laws of states and municipalities, top management of the food processing organization is held responsible. It is the usual practice, in court procedure under these laws, to not only take action against the company, but also against the company president or general manager. These executives can be fined. And in some cases prison sentences have been levied against them. The answer, therefore, to the question, "Who is responsible for sanitation?" is, "Top management of the company."

You, of management, may handle this by assigning some of the responsibility to others. The general manager has, for instance, a production manager, a sales manager, and a credit

manager under him to take the major load of different phases of the plant's operation off his shoulders. This group working as a team, produces a salable product, at the right price, and a going business results.

If there is no one on this team who thinks in terms of sanitation, it is not likely to exist. Therefore the need for a plant sanitarian becomes apparent. And, as you go along in considering the problems of this subject, it becomes evident that some phase of sanitation is involved in almost every department. Sanitation is not something to be done merely on Saturday, or occasionally by people from the outside. It must emanate at all times from within the organization.

In short, good sanitation is everybody's job. It must be sold down the line to every department manager and employee—to be practiced because it is proved to be the right thing to do. The end product is not only good sanitation but also pride, on the part of every employee, in sanitation as a program that will have much to do with promoting sales and good public relations.

Your sanitation supervisor, or plant sanitarian, may be a part-time or full-time employee, depending upon the size of the plant. His responsibilities must be to the general manager or the president of the company, just as other divisional managers are responsible to the senior officer. After all, it is the general manager who can be held responsible, under the law, and who must take an active interest if the desired results are to be obtained.

Qualifications Required

Selection of the right man for this job of plant sanitarian is one of the most important keys to success. Above everything else, he must be sincerely interested in his work. He should have educational background that will qualify him for his work, or be given special training.

Further, he must be a man who can get along with everyone in the plant. With cooperation from management, his work will, before he is through, have some effect on the job of everyone in the organization. An imaginary trip through your plant with your newly appointed sanitarian will quickly reveal that these qualifications are important, and that great care in the selection of your man will be required.

Now let's see how management and the sanitarian tackle the problem:

The goal is to prevent contamination, and the most revealing approach is from a plant-flow point of view. This must begin with raw materials which are acquired by the purchasing agent. Maybe the plant manager and sanitarian had better sit down and talk the matter over with the purchasing agent, to see what precautions are taken to prevent the company from being supplied with contaminated raw materials. It would probably be well to call the receiving clerk to sit in on this conference, since purchasing and receiving are closely associated.

Are these materials shipped in packages that protect them from contamination? Are samples of the raw products obtained and analyzed for extraneous matter? Obviously, a contaminated raw product will result in a contaminated finished product, so that a system of purchasing and receiving must be developed that takes all reasonable safeguards in protecting the plant from such raw materials.

Responsibility for the condition of these raw materials cannot be merely wished off on your supplier. You are morally responsible to your customer, as well as responsible under the law for using only sanitary, uncontaminated materials.

Your receiving department must know the difference between contaminated and uncontaminated materials. There must be an inspection of these materials on arrival, and the results of such inspection should be a matter of record. This is practical from a business viewpoint, since the time to reject unsatisfactory materials is before they go into the plant proper. The sanitarian will have to cooperate with the receiving department in determining an inspection procedure for the individual raw products used.

The next place where the raw product may become contaminated is in your own storage. Here there can be no argument concerning responsibility, since you obviously must "stand behind" the materials which you are storing for future use. Review your present storage practices, from the viewpoint of prevention of contamination, and see where improvements can be made.

Most food plants have some form of handling equipment that receives raw materials in quantity and transports them to the point where the actual production process begins. This equipment is frequently one of the prime sources of trouble. For there seems to be a tendency to neglect ordinary cleaning of this machinery, since its use precedes that of actual production equipment. Some of this equipment is very difficult, if not impossible, to clean.

It is at this point in raw materials handling that your raw products should receive their final inspection. In many types of food processing, it is possible to put in automatic equipment that will do an inspection job. You and your sanitarian must look over this handling equipment with a critical eye to see if it contaminates your product just before processing.

Pertinent Questions

Now step into the production area of your plant. And first stop for a few minutes and just watch what is going on. Then ask yourself these questions: Are employees clean and properly dressed? Are they in good health? Is anyone working with skin eruptions on his hands? Do they wash their hands when they are soiled? And what happens when something falls off a machine or conveyor belt onto the floor? Is it picked up and put back into production? Do employees climb over machines and step on conveyor belts or production zones of machines with their dirty shoes, and go right ahead with production?

You are responsible for these employee acts, just as you are responsible say, for the acts of your truck driver.

Look at your machines and see if they are of a sanitary design. Do the

(*Turn to page* 221)

Your Sanitarian

- **Have you got the right man?**
- **Do you give him full management cooperation?**
- **Has he had an opportunity for short-course training?**

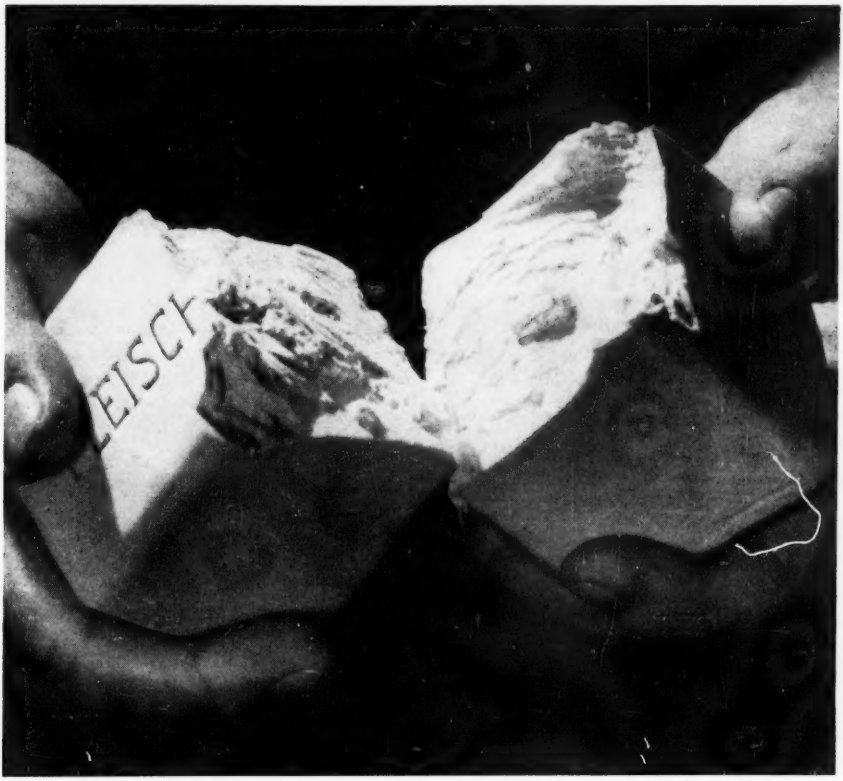
Your Personnel

- **Are they properly, cleanly dressed?**
- **Is their health closely inspected?**
- **What of their habits with materials and machines?**
- **Have they been "sold" on good housekeeping?**

Your Raw Materials and Machines

- **Do your materials come in protective packages?**
- **Are all these "raws" regularly inspected?**
- **Do you store them safely?**
- **Is your handling equipment kept sanitary?**
- **Is processing equipment kept in top order?**

A SPECIAL FOOD INDUSTRIES REPORT



Bakers Yeast—Unique Product

It has its roots in brewing industry, but is now made from molasses instead of grain. Nutrient influx and violent agitation give maximum yield and hold down fermentation

FREDERIC W. NORDSIEK

Research Service Department, Standard Brands Inc., New York
Photos courtesy The Fleischmann Laboratories, of Standard Brands Inc.

The manufacture of yeast for use in leavening baked products is exceptional in that it is the only industrial operation devoted to large-scale output of living micro-organisms. And most notable is the high degree of purity attained.

Historically speaking this industry has its roots in the brewing industry. However, the introduction, around 1915 of the Hayduck process, which made molasses instead of grain the basic raw material of manufacture, served to sever most of the bonds between brewing and yeast production.

Imported and domestic cane and beet molasses are used for yeast manufacture in the United States. Generally, a mixture of cane and beet molasses is used in each mash,

since both are known to provide constituents favorable to yeast growth. Waste sulphite liquor from the paper pulp industry has been widely used as the primary raw material for manufacture of food and feed yeasts. However, on this continent sulphite liquor has thus far been utilized in the making of bakers yeast by only a single producer, located in Canada.

■ **One of the most urgent needs is more fundamental knowledge about molasses. For, even within a given type, it varies greatly according to: Locality of its origin; composition of the cane or beets, determined by soil, climate, or related influences; method of processing the cane or beets, and handling of the molasses.**

Although it is primarily a source of carbon for growing and reproducing yeast, molasses may also contain several other factors that support or promote yeast growth. Among these are nitrogen, vitamins (bios factors), and certain mineral elements that have stimulating effects even when present only in trace amounts.

On the other side of the ledger, molasses may contain substances toxic to yeast. Such inhibitors sometimes are mineral elements other than those favorable to growth, but are frequently of unknown nature.

Finally, molasses differs widely and erratically in buffering power, of importance in the march of pH throughout the process. The yeast industry looks to vigorous research in molasses for an improved understanding of the subject, which in turn will make possible better control over, and regulation of, the industry's primary raw material.

Other Nutrients Required

In addition to prepared molasses, yeast mashes also require certain other raw materials which, although relatively small in quantity, are indispensable. Foremost among such additives are nitrogen sources.

One of the basic advances inherent in the Hayduck process was industrial application of the ability of yeast to utilize certain synthetic or inorganic compounds as nitrogen sources. Materials of this type commonly used include aqua ammonia, ammonium sulphate, ammonium phosphate, and urea.

Although such substances usually are the least expensive for this purpose, it is sometimes expedient for a yeast manufacturer to employ an organic nitrogen source. Thus, corn steep liquor may be used by concerns who either process corn themselves, or are located near a center of the corn processing industry.

To obtain maximal growth, molasses yeast mashes must also be fortified with phosphorus. Ammonium phosphate provides this element in addition to nitrogen. Other phosphorus sources commonly used are calcium acid phosphate and phosphoric acid.

The roll call of major raw materials used in yeast manufacture may now be completed with neutralizing agents. Control of pH throughout the process is an essential feature. To some extent, it may be regulated by alternating between aqua ammonia and ammonium sulphate as the nitrogen sources. Nevertheless, in certain phases of the process direct neutralizing agents are needed. Materials employed for this purpose include sulphuric acid, sodium carbonate, and sodium bicarbonate.

SHIPS bring imported cane and beet molasses, tank cars the domestic product. Seen here is a European vessel unloading at yeast plant.

Process Details

Molasses is prepared for use by sterilization, clarification, and dilution.

Sterilization accomplished by heat, is employed to destroy microorganisms present in raw molasses, so that these microbes will not multiply in the mashes, at the expense of the yeast, and contaminate the finished product. Heat applied for sterilization also aids in clarification.

Clarification removes heat resistant micororganisms, together with a sludge of material that is valueless for yeast growth, and that may even have deleterious influences if permitted to remain. One of the adverse effects of molasses sludge is discoloration of the finished yeast.

Appearance of yeast is mainly a matter of fashion and is no direct index of the all-important fermentation strength. As only a few pounds are used to make several hundred pounds of dough, even a dark yeast does not appreciably discolor the bread.

Even so, American manufacturers have perfected a product of a clear, bright, uniform light color and smooth texture. Users have come to expect such an appearance, with the result that its maintenance has become one element of modern yeast quality control.

In this country, molasses clarification is usually accomplished by filtration or by settling followed by decanting. (Abroad, centrifuging is sometimes used.) Ammonium phosphate, which functions as a yeast nutrient, may be added prior to clarification because this compound also acts as a precipitating agent.

Moreover, yeast manufacturers using corn steep liquor may add this material to the molasses prior to sterilization. By this procedure the steep liquor is itself sterilized, and it also promotes separation of the molasses sludge.

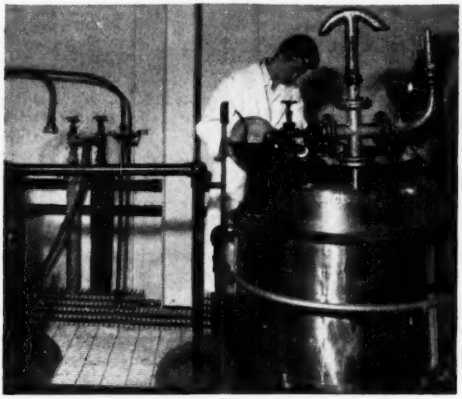
Dilution. Following clarification, the sterilized molasses is diluted with water before being added to the mashes.

Molasses containing much sulphur dioxide may require preliminary treatment with oxidizing agents to destroy this compound, which is strongly antagonistic to yeast. Ion exchange procedures, may in the future, prove useful for removing factors that inhibit yeast growth and propagation.

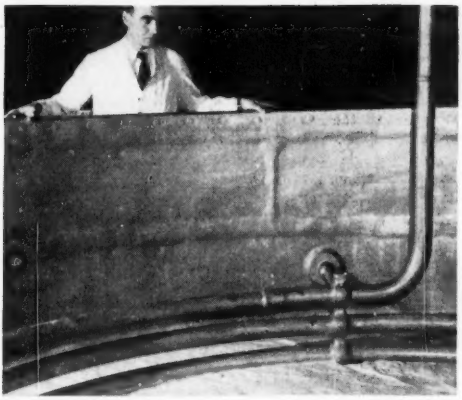
Batch Operations Predominate

Continuous processes have been used successfully to make food and feed yeasts. But it is a question whether such procedures can ever be carried out with the low contamination and high degree of standardization required for baking yeasts. They are grown in successive stages of increasing size, starting with cultures in laboratory glassware, then proceeding through small metal vats in the factory, and on to huge fermenters, sometimes several stories high and accomodating mashes as large as 60,000 gal. The number of such stages varies, but may reach upward of a dozen.

From Laboratory Flask to Packaged Yeast

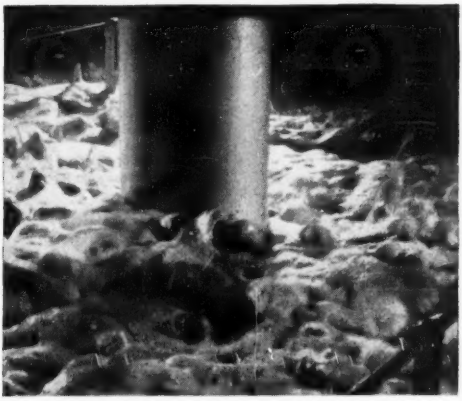


1 **YEAST CULTURES** are started in small stainless steel tanks to keep down metal and bacterial contamination.

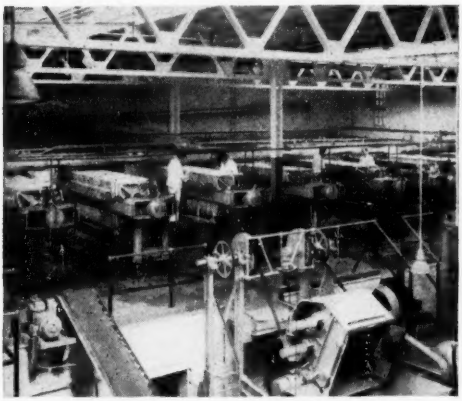


2 **COOLING WATER** is circulated through coils in large fermenters to maintain optimal temperature for growth.

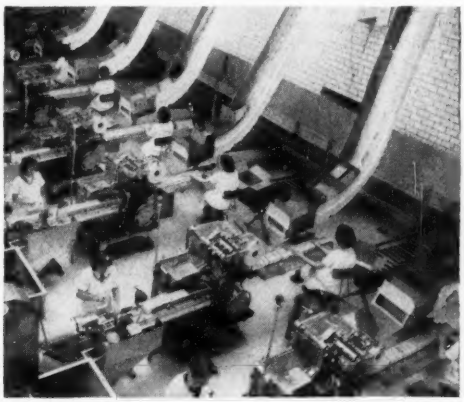
3 **SEPARATION** of spent wort from yeast cream between successive stages. It is carried out by centrifuges.



4 **VIGOROUS AERATION** is required to keep pace with increasing concentration of yeast cells.



5 **FILTER PRESSES** remove excess moisture from yeast cream. Filter cake is then blended in mixers.



6 **COMPRESSED YEAST** is extruded continuously, then automatically cut and wrapped, and finally hand packed.

This stage-wise method of operation affords several advantages. The small, earlier stages may be run with a high degree of sterility and protection against heavy metal contamination. In this way, a sturdy yeast growth is economically established for use in inoculating the final large stages where high yields must be obtained at all costs.

This practice of growing yeast in successive stages likewise reduces the length of time that the huge fermenters, which are expensive to maintain and operate, are monopolized by single batches. Furthermore, a manufacturer who produces at more than one location may carry out the early stages at a single factory, and ship stock yeast, in compressed or dry form, to his other plants for use in inoculating the final large stages.

Advantages of this procedure are the economies accruing from confining to a single plant the laboratory facilities, special equipment, and specially trained personnel needed to carry out the critical earlier stages.

Cardinal Principles

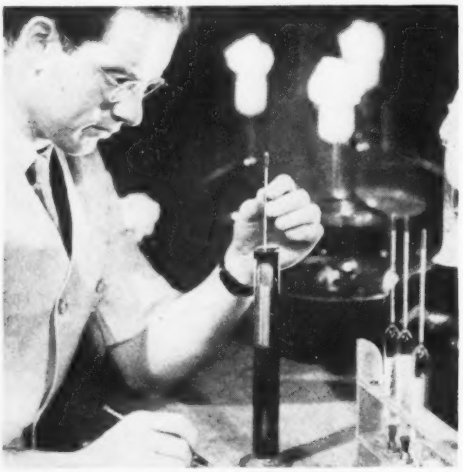
During the later stages of production, the zulauf comes into operation. "Zulauf" is a German word meaning *influx* that has long been an integral part of the working lexicon of the American yeast maker. It stands, together with aeration and the use of ammonia as a nitrogen source, as one of the three cardinal principles of modern yeast manufacture, as enunciated by Hayduck.

Zulauf consists of trickling molasses and other nutrients into the propagating tanks, at such a rate that the concentration of nutrients available is always exactly matched

Selection, Control, and Processing Tests Are Vital Steps

RESEARCHER selects single yeast cell then, with aid of microscope, he uses special pipette to isolate it.

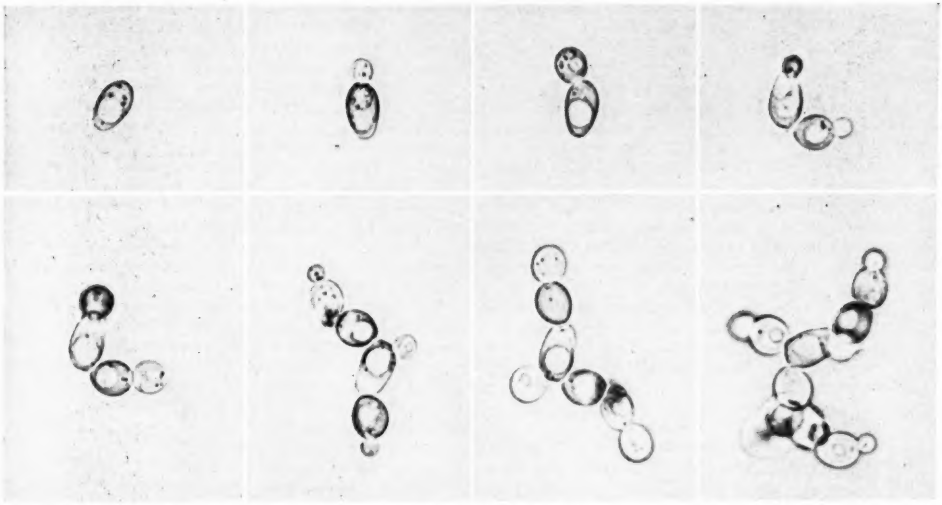
EXAMINATION under microscope reveals state of maturity of yeast as measured by proportion of budding cells.



SPECIFIC GRAVITY, as determined by saccharometer, is measure of concentration of yeast in mashes.

NITROGEN CONTENT of finished yeast is routinely determined by means of Kjeldahl apparatus.

Microscope Reveals How Yeast Cells Multiply



PHOTOMICROGRAPHS, taken at 15-min. intervals, show how one cell increases in 2 hours (Magnified 1000 X).

to the concentration of yeast cells existing at the moment. This balance is accomplished by the addition of nutrients at a progressively increasing rate, thus keeping abreast of the geometrical progression of the growing yeast population in the fermenter.

Advantage of the zulauf stems from the fact that it prevents either a shortage or a surplus of nutrients at any time, since either of these extremes slows down yeast propagation and decreases ultimate yields.

Vigorous aeration of mashes stimulates growth and reproduction while inhibiting fermentation. Thus yield of yeast is maximized, and production of alcohol is minimized. Like zulauf, aeration is started at a relatively low rate and then increased exponentially to keep pace with the increasing concentration of yeast cells in the propagating tank.

During the last half hour or so of the final stage of yeast propagation, the zulauf is stopped and aeration is reduced. These measures arrest rapid reproduction, thus permitting the yeast present to achieve maturity. Yeast consisting of mature cells has better keeping quality than that with numerous cells in budded form.

Control of pH during propagation provides an effective means of favoring yeast growth and, at the same time, holding down bacteria. Mashes are maintained at approximately pH 4 to 5 throughout most of the process. This acid level is optimal for yeast, but is inhibitory to many of the bacteria that may gain access to the mash as contaminants. Some manufacturers may shift the final pH to another level, with the objective of thus influencing the characteristics of the finished yeast.

Optimal temperature for yeast growth is approximately 30 deg. C. (86 deg. F.). Laboratory yeast incubators are maintained at this temperature by means of heating units. It may come as a surprise, therefore, that in yeast manufacture, cooling rather than heating is required. This paradox results from the intensive rate of growth achieved by the modern yeast process—a growth so rapid that the heat of metabolism is greater than can be dissipated into the atmosphere. Therefore, during the later hours of propagation, it is necessary to cool the fermenters. This is usually done by means of circulating water in coils or in water jackets.

At the conclusion of yeast propagation, the mash is rapidly chilled by means of cooling water and then sent to centrifugal separators. These machines remove spent wort from yeast "cream" with a heavy solids concentration. The yeast may now be washed, and the wash water removed by means of separators. Finally, the cream goes to filter presses equipped with cloths. Here, more water is removed, so that the suspension becomes a mass of compressed yeast. From the presses the product proceeds to mixers, where it is blended and then forced through extruder nozzles for cutting, wrapping, and packing.

Manufacture of active dry yeast follows essentially the same pattern as that just described. To make the dry product, compressed yeast, in finely divided form, is exposed to warm dry air. Thus, the moisture level is reduced to roughly a tenth of that existing in the compressed product, and a dry, friable, relatively stable, but still active, yeast is obtained.

Cultures Carefully Maintained

Yeast, manifestly, can be no better than the seed culture from which it is made. Successful management of the culture phase depends upon stable maintenance of available satisfactory cultures. Also, to some extent, upon the development of improved strains.

Maintenance of stable yeast strains is not a simple matter; microbial cultures are notoriously subject to involution or degenerative change, and yeast is no exception to this general rule. Starting cultures from single cells helps prevent this change. In fact, the yeast industry routinely practiced single-cell isolations in the days when most bacteriological laboratories were satisfied with fishing of colonies from plate cultures on solid media, or transfer of loopfuls of tube cultures. Intricate micro-manipulating apparatus is used in some laboratories to select single cells under the scrutiny of the microscope. Dilution procedures are also used to accomplish single-cell isolations.

Stock cultures are maintained under refrigeration, in liquid or on solid media, sometimes covered with sterile

mineral oil to prevent drying. Recently, lyophilization, or drying from the frozen state, has been used in some laboratories; but there is current disagreement as to whether this process adequately protects yeast against involution.

The pursuit of improved baking yeasts is an integral part of a continuing systematic search for better industrial yeasts. New cultures are sought by making isolations from industrial sources, isolating wild yeasts from nature, and by obtaining new strains offered by culture collections. In addition, stock cultures are continuously observed for possible development of mutants. New cultures, secured in any of these ways, are then screened in the laboratory by means of biochemical procedures and, if they show industrial promise, are given practical trials. As a potential source of improved yeast strains, the industry is watching with close interest the current research in yeast genetics, including the hybridization of yeasts.

It may be remarked that improved yeast strains, however developed, are in the public domain as soon as they are marketed in living form, because the United States patent laws as now interpreted do not provide for the patenting of microorganisms as such.

Single Species of Yeast

For industrial uses other than baking, a wide variety of yeasts, falling within at least a dozen genera and more species, are used. All baking yeasts, however, are the classic industrial species *Saccharomyces cerevisiae* (this name literally "the sugar-fungus of beer"). Although many different strains of this yeast have been used, all come within two broad types that are differentiated by their baking characteristics, and may also be distinguished biochemically in the laboratory.

Attributes of a baking yeast are determined by how it is made as well as by the culture used, but the following generalizations may be drawn concerning the two principal baking types:

1. *GM Type.* "GM" means Gebruder Mayer, the German for Mayer Brothers, a name associated with early use of this yeast. Other things being equal, this strain possesses a moderately vigorous fermentation activity, and, in the form of compressed yeast, has excellent keeping quality. As a result, it is customarily used in the United States to make home-use compressed yeasts, that must be able to withstand relatively rigorous distribution conditions. Abroad, the GM culture is also used for commercial bakers yeasts.

2. *Commercial Bakers Type.* This strain is a more vigorous fermenter than the GM, and thus it is able to satisfy the exacting requirements of commercial bakers in this country. Conversely, the bakers type strain has lower inherent keeping quality than the GM. Nevertheless, it can be manufactured so as to be capable of holding up through the relatively direct distribution channels used to supply yeast to commercial bakers. Bakers compressed yeast usually is not more than a week old when used, whereas compressed yeasts for home baking may reach ages several times as great.

Either of these two types may be employed to make active dry yeasts, depending upon the use to which the product will be put and the distribution conditions it must withstand.

Plant Engineering

Provision of sufficient propagating tank capacity is a prime problem in the design of yeast plants. Stainless steel is the ideal material for these tanks, because it minimizes metallic contamination of mashes and also simplifies maintenance. More and more of this metal is appearing in American yeast plants, with equipment made from it being installed to replace worn out copper units. But the modest profit margins on which the industry operates require that such replacements usually be made only as existing equipment approaches the end of its useful life. As a result, much of the ruddy copper that betokens the brewing industry heritage is still to be seen.

Iron is also used, especially in piping. But even when copper and iron occur of necessity in plant equipment, it is, nevertheless, possible to hold down heavy metal contamination of the yeast by providing stainless steel tanks for the small early stages of propagation. This is done by designing pH levels through the process (including molasses treatment) so that the dissolving of metals from the equipment is minimized, and sometimes, too, by protecting the interior of copper tanks with resistant coatings. Beyond question, however, such expedients will in time be obviated by the universal use of stainless steel.

The importance of air in this process may be grasped from the fact that approximately 20 lb. are blown into the propagating tanks during the manufacture of a single pound of yeast. Pharmaceutical plants, producing antibiotics by deep fermentation, require similar volumes of air. They are able to provide it in sterile form by use of scrubbing towers and other equipment that may reach a physical size almost as vast as that of the plant devoted to all the rest of the process.

Whether such huge investments in air-purifying equipment can ever be possible for an industry that manufactures an inexpensive item like baking yeast is a question. For the present, engineers designing these plants have had to be satisfied with the degree of air purification that can be obtained by oily ring filters and similar equipment. Dependence is placed upon low pH of mashes to inhibit the growth of any bacterial contamination that may be introduced along with the air.

As a result of the high pressures required for the pressing of yeast (in the order of 150 psi.), this has usually been a batch operation, employing positive pressures. Continuous yeast presses, operating on the vacuum principle, have been devised, but these have shortcomings, not only of the low maximum pressures attainable, but also of difficulties in cleaning and sanitizing.

Huge Quantities of Water Used

As is true of so many food processes, water may be considered to be the life blood of yeast factories. That which comes in contact with yeast as a dilutent for the mashes or as wash water for the finished product must be of high sanitary quality and, in addition, must be particularly low in mineral content. It is frequently necessary to achieve this degree of purity by means of treatment, including chlorination.

For cooling purposes, a source having inferior quality may be used, provided precautions are taken against cross connections. In this regard, it has been stated that the availability of water for cooling the propagating tanks may be the limiting factor controlling total output at any given location.

Waste disposal is another knotty engineering problem faced by the yeast industry. Molasses sludges and spent worts are high in organic matter and, therefore, have a heavy biochemical oxygen demand. It is sometimes necessary to treat such wastes before discharge in order to prevent serious stream pollution. Several American yeast factories have up-to-date waste treatment plants that accomplish reduction in BOD as high as 98 percent.

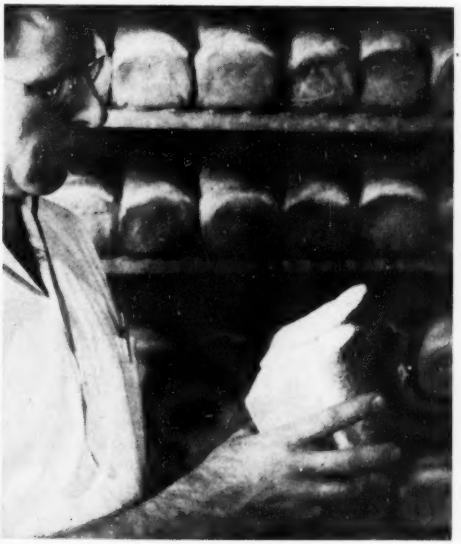
Other Yeast Products

Baking yeast is the major product of the yeast industry, and the bulk of it is marketed in the compressed form, although active dry yeasts are gaining in usage for home baking.

Leavening Power of Yeast Is Checked Empirically

"PUNCH" TESTS involve preparation of small standardized doughs and observation of the time required for the yeast to leaven these to a given volume. Doughs are then discarded. Different formulas are used to estimate performance of the yeast when it is employed in various types of bakery doughs.

TESTS are carried out from time to time in order to determine how well the yeast leavens the dough.



BAKING tests are run on the leavened loaves to judge the quality of the resulting products.

The remaining products are varied in nature. Next to baking yeasts in quantity manufactured are inactive dry yeasts, used in human foods, pharmaceutical products, and animal feeds as sources of natural vitamin B complex factors and of protein. Since the nutritional principals that abound in yeast are soluble in water*, aqueous yeast extracts are prepared in concentrated or dry forms to provide particularly high potencies of these nutrients.

Yeast is an especially rich source of ergosterol, a sterol that is the precursor of vitamin D_2. This is isolated and supplied to the pharmaceutical industry for activation to make vitamin D.

Another vitamin D preparation is irradiated dry yeast, which is dried whole yeast that, during processing, is irradiated with ultraviolet light. This product is widely used to introduce vitamin D into the rations of four-footed farm animals. It is also employed in pharmaceutical preparations where a dry, uniform source of vitamin D is required.

Still another constituent of yeast that is separated in highly purified form and supplied to the pharmaceutical industry is nucleic acid (also made as sodium nucleate). Finally, hydrolyzed yeast proteins are used, just like other hydrolyzed vegetable proteins, to enhance food flavors. They are also employed clinically as a concentrated source of predigested protein.

Quality Control

As in the case of any manufactured food product, quality control of yeast begins with the raw materials, then extends through regulation during the process, and culminates in testing of the finished product. With respect to raw materials control, the complexities of the molasses problem have already been sketched. Control of the remaining materials presents no special problems, but nevertheless requires unflagging vigilance.

Regulation during the process is an intensive procedure. Mash schedules are laid out in advance in great detail. However, vagaries in yeast growth, and in the nature of raw materials, necessitate constant testing of mashes throughout the process, and the making of corresponding adjustments. These process control determinations are mostly performed on the factory floor.

The principal tests applied to the mash are:

1. *Specific gravity*, as determined by means of a saccharometer. During the zulauf stages, when the nutrients added are matched to the yeast population, specific gravity of the mash becomes a measure of the concentration of yeast present at the moment.

2. *Determination of amino nitrogen* by means of the formol titration. This test reveals the amount of nitrogen available for yeast propagation.

3. *Acidity and pH*. The former is determined by direct titration; the latter by means of modern electronic instruments.

To supplement the above determinations, made directly upon the mash itself, instruments must be operated to indicate at all times the rate of the zulauf, the rate of aeration, and the temperature of the mash.

Chemical tests, routinely applied to finished yeast, include determinations of nitrogen and phosphorus. These results indicate how well the two elements have been regulated in the mash. Moisture content of the finished yeast is also gaged. It must be held within a narrow range, for otherwise either consistency or keeping quality suffer.

Examination under the microscope reveals the state of maturity of the yeast, as measured by the proportion of budding cells present. This test shows how well the final ripening phase of manufacture has been effectuated. The yeast is also subjected to microbiological examination to make sure that significant amounts of extraneous microorganisms are not present. It is particularly important that yeast be free from *Bacillus mesentericus*, the spore-forming bacterium that produces the troublesome spoilage of bakery products known as "rope."

The ultimate test of yeast quality is how well it fulfills its function of leavening doughs. Leavening power is best determined empirically, because the fermentometers, and similar instruments for this purpose at present available, have limitations of one sort or another.

Complete baking tests are carried out from time to time in order to see how well the yeast leavens the dough and, at the same time, to judge the quality of the baked products produced. But routine determination of leavening power usually is done by means of "punch" tests. These involve the preparation of small standardized doughs and observation of the time the yeast requires at a fixed temperature to leaven such doughs to a given volume. Then the dough is merely discarded, rather than being formed and baked.

Different punch-test dough formulas, varying as to content of sugar and other ingredients, and acid level, are used to estimate performance of the yeast in various types of bakery doughs (bread doughs, sweet doughs, or sour rye doughs).

Keeping quality of yeast may be estimated on an accelerated basis by exposure to a high temperature for a definite period of time and then re-testing to determine the resultant loss in fermentation strength. Keeping quality may also be checked routinely by the so-called "field quality control" procedure of obtaining yeast samples from bakeries and grocery stores and returning them to the laboratory for testing to learn the effects on the yeast of normal distribution.

Looking Ahead

What lies ahead for the yeast industry? Basic research in the physiology and metabolism of yeast is intensively pursued in many quarters, because yeast is one of the most convenient experimental organisms of the biochemist.

Results of such research are scrutinized with close interest for possible industrial applications. The current work in yeast genetics may yield improved yeast strains for manufacturing uses. The need for prosecuting vigorous study of molasses as a raw material has already been indicated.

As with most food processes, conversion from a batch operation to a continuous manufacture remains an attractive objective. Even if propagating must continue on a batch basis, development of satisfactory continuous yeast presses would be a great step forward.

A means of producing truly sterile air in large volumes at low cost would be welcomed.

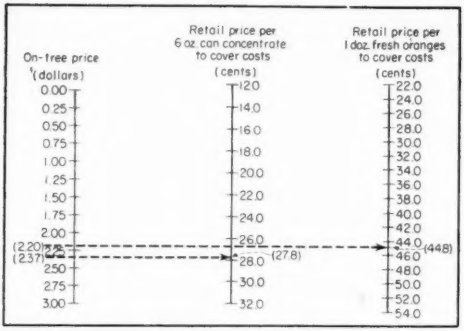
Successful automatic pH regulation in the sugar industry suggests the possibility of rendering automatic the same phase of yeast manufacture.

Reports of effective automatic adjustment of added yeast nutrients and aeration during propagation have recently been heard from abroad, and adoption of such procedures by American yeast makers is an inviting prospect.

These and other aspirations and problems of the yeast industry rest in the able hands of the research scientists, engineers, and other members of the yeast company staffs.

Acknowledgment: The author wishes to thank Mr. George W. Kirby, Technical Director, Fleischmann Manufacturing Division, Standard Brands Inc., New York, for providing council and guidance during the planning and execution of this article.

* The B complex group of vitamins was, in fact, originally defined as those water soluble vitamins present in yeast and liver, although it is now known that vitamin B_{12} does not occur in yeast.



PRICE CHART—To quickly find retail price that covers cost induced by any on-tree price for frozen orange concentrate or fresh oranges. Simply draw horizontal line from known on-tree price in 1st column and read off retail price in 2nd or 3rd column. For example: Top line starts from last year's $2.20 on-tree price for fresh oranges and shows that 44.8c. per doz. at retail covers costs. Lower line starts at $2.37 on-tree and indicates that a 6-oz. can of concentrate must retail at 27.8c. to cover costs.

TABLE—COST OF PROCESSING Florida Oranges Based on a 90-lb. Box Yielding 5 Gal. of Juice

	Fresh Fruit (200 to a Box)		Canned Juice (13.7 46-oz. cans)[1]		Frozen Concentrate (25.9 6-oz. cans)[1]	
On-Tree Price 1950[2]		$2.20		$1.63		$2.37
Pick and Haul		.35		.35		.35
Processing[3]						
Containers	.373		.837		477	
Labor	.195		.138		185	
Manufacturing	.080	.83	.188	1.20	.297	1.04
Adm. & Selling	.085		.112		051	
Other	.10		.031		025	
Advertising and Handling						.39
Freight to New York		1.10		49		.19
Delivered at New York Per box		$4.48		$3.77		$4.34
Mark Up		2.98[4]		.94[5]		2.89[6]
Total Retail per Box New York		$7.46		$4.71		$7.23
Per Unit		.45 doz.		35 can		.278 can
Per Gallon of Juice		1.49		.94		1.44

[1] Average yields Florida Canners Assn. reports.
[2] Mutual average prices.
[3] Costs as given by University of Florida reports.
[4] 40 percent discount on retail.
[5] 20 percent discount on retail.
[6] 40 percent discount on retail.

Orange Concentrators Face Tough Cost-Price Problems

They've set top "on-tree" levels to hold retail prices. Growers' cooperation is question.

C. E. WRIGHT
"Food Industries" Correspondent

The rapidly expanding frozen concentrated citrus juice industry of Florida is taking to heart some lessons in production costs and marketing prices that were learned the hard way during the 1949–50 season.

As a result of conditions over which processors had little or no control, frozen orange juice concentrate was virtually priced out of the market in the early part of 1950. Unusually high prices for fresh oranges caused the retail price of a 6-oz. can of concentrate to zoom to 33c. Housewives balked at this price, and sales died.

Here is the story: Owing to the late start of the 1949–50 blooming season, orange shipments were light until October, 1949. A high price of $4.50 per box f.o.b. was established for the month. As volume increased, prices dropped, hitting a low of $2.35 in early November.

Then Florida Citrus Mutual, an organization of growers, stepped into the picture and set an f.o.b. floor price of $2.35 for fresh fruit and a minimum delivered price to processors of $1.10. This prevented the market from degenerating into chaos, but price gyrations did not end there.

Shortly after the first of the year, concentrators began buying oranges in volume and prices began to spiral because of three-way competition among canners, concentrators, and shippers of the fresh fruit. An added factor was the severe freeze in California, thus further contributing to the rise.

In March, the auction price of fresh oranges averaged $6.37, and concentrators were paying $3.50 delivered at their plants. Then processors curtailed their purchases and prices dropped again. On April 22, Florida Citrus Mutual again stepped in and established prices of $3.25 to $3.75 for packed fruit and $2.50 per box delivered to processors.

What it all adds up to is that last season a sharply fluctuating fresh fruit market left the concentrate companies out on a limb on figuring their costs. It was with this background that concentrators started the 1950–51 season. And the big question is, with rising prices everywhere, can concentrators hold their present retail prices of around 21 to 23c.

To keep retail prices at a competitive level, processors determined that the delivered price per box at their plants should not be above $1.425. This allows 35c. per box for picking and hauling, or an on-tree price of $1.075.

Not All Growers Cooperate

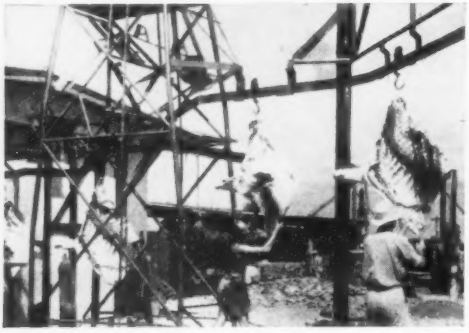
But not all growers want to be bound by this price that the processors have determined is what they can afford to pay and still remain in the market at a competitive price level. This is particularly true of some of the absentee growers, who note the high prices sometimes paid at New York auctions for fresh fruit and prefer a gamble to a guaranteed price. These absentee owners feel this way, notwithstanding that the concentrators, particularly the cooperatives, tend to the fertilizing, spraying and picking of fruit groves with more zealous care than the owners themselves would be able to give if they were on the ground. And not all of these growers are members of Florida Citrus Mutual, which in this last season, its first, has won support of members and processors.

Further illustration of some growers' attitudes occurred during a recent effort to establish a new $2,000,000 concentrating plant near the Indian River area. Those would-be processors who were to furnish the capital insisted on long-term contracts with a sufficient number of growers to assure an ample supply of fruit. So far,

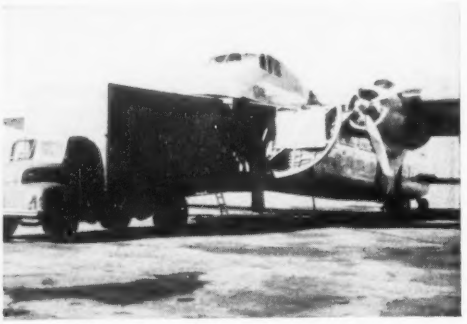
this obstacle has not been overcome.

Florida Citrus Mutual comments on the necessity of cooperation between growers and processors as follows: "With the increased production of young trees not yet in full maturity and the new acreage that has been planted, unless some great disaster occurs, not a few years from now 100,000,000 boxes will be a very short crop in Florida. (The estimate for 1950-51 is 98,400,000 boxes.) Unless we maintain the orderly marketing and distribution that can only be brought about through Mutual, those large crops in the near future will not be marketed with profit to those who produce them."

At this time, processors have presented data to growers showing that only through mutual recognition of each other's problems can both groups prosper together. Figures from the department of economics of the University of Florida were used in compiling the accompanying table and developing the price chart.



AT GLENROY: Into air-freighter via monorail



AT WYNDHAM: Out plane-nose and into truck

Australian Beef Takes to the Air

Flying carcasses from inland slaughterhouse to coast avoids losses that were suffered in driving herds over grueling, tick-plagued, 300-mile route

AIR SHIPMENT of beef proved itself a commercial success in Australia last year when over 2,000,000 lb. were flown from an inland slaughterhouse, surrounded by difficult terrain, to a shipping center 180 air-miles away.

Previously, cattle were driven from the area around Glenroy to the coastal port of Wyndham over 300 miles of arduous stock routes. Tick-infested areas along the way took their toll, and cattle that did get through lost an average of 80 to 90 lb.

To develop even a rudimentary road system would take millions; a railroad would be even more costly. But no such difficulties faced the introduction of an air transport system. And many airfields already were established.

In 1949, "beef by air" became a reality with the formation of Air Beef Pty., Ltd. Construction of complete slaughterhouse facilities at Glenroy and an 8,000-ft. runway cost only $80,000. A Bristol Freighter, made in England by the Bristol Aeroplane Co., was acquired. It has nose-loading doors—deemed an improvement over side-loading means. The plane can take off with a cargo of better than 13,000 lb.

The Australian government helped things along with a subsidy of 1d (about 1c.) for each pound of meat delivered at Wyndham. It was felt the experiment could have "a significant bearing on the future cattle industry of northern Australia."

But the critical matter was to prove that once beef is chilled to the correct temperature it can be transported in an unrefrigerated aircraft to a coastal cold storage facility without deterioration in appearance or quality.

Actual operation over the 70-min. air run proved it could. In fact, on many occasions Glenroy beef was upgraded by the inspector at Wyndham.

During 1949, 1,800 cattle were slaughtered at Glenroy and flown to Wyndham. This last year, a peak of 300 head per week was reached, coming to 2,062,304 lb. in the 5-month season from May to September.

Stockmen at Glenroy bring in a herd and hold it some distance from the slaughterhouse. Each day 45 to 50 head are cut out and brought to the pens. After slaughtering, carcasses are cut into quarters and these are graded individually. The meat is then chilled for transport.

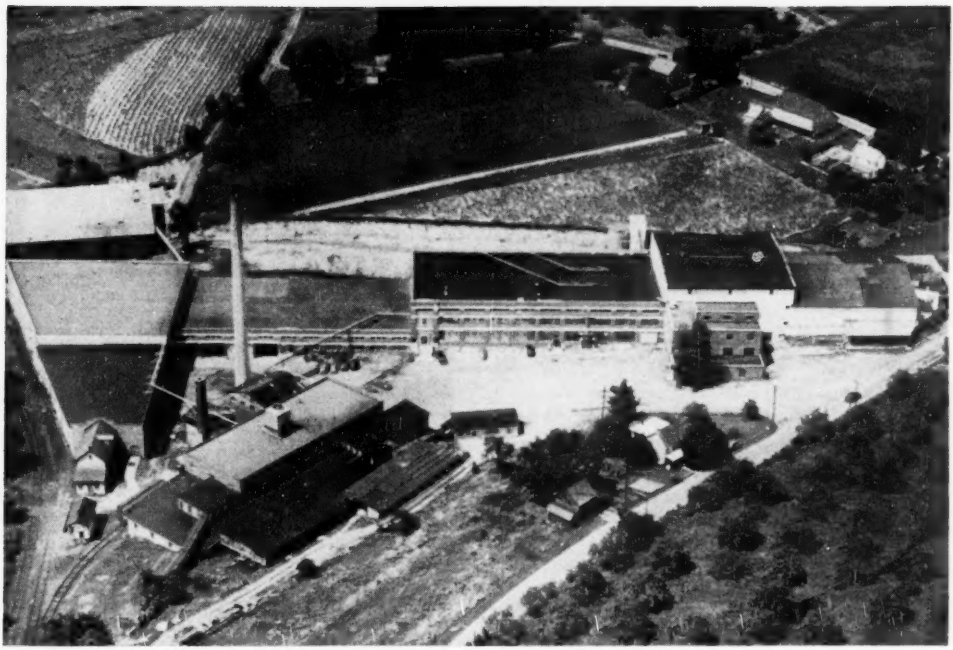
Specially insulated trucks meet all flights at Wyndham. Backing up to the aircraft's nose, they are quickly loaded and whisk the cargo to cold storage.

In addition to the huge reduction in lost poundage, air beef enables farmers to clear their property of useless, aged stock that could not have made the drive to Wyndham. Every one of these now has a nominal price of $12 when slaughtered at Glenroy.

Figures for one batch of "soft" cattle, unfit to make the overland journey, are revealing: Killing them at Glenroy yielded 79.3 percent export freezers (carcass export quality, with bone in) and 21 percent salable for small cuts. Average hot weight was 592 lb.; average net return $22 a head. Estimated return for the land trip was 10 percent as freezers.

An offshoot of the scheme is pig raising at Glenroy. In 1950, 70 pigs were flown in for fattening. After a small killing at the end of the season, 5,439 lb. of pork were flown out. Two boars and 100 sows have also been flown in for breeding purposes.

Australian observers believe the flying of beef has come to stay. Not only has it improved quality and quantity of beef produced by existing properties, but it has indicated ample possibilities for new settlers. Export needs and Australia's growing home demand insure a constant market.



MANY PRODUCTS FROM SINGLE FRUIT. Into this modern Knouse plant at Peach Glen, Pa., go 30,000 bu. of apples a day. And out come apple-pie slices, butter, jellies and vinegar. Company's sister plants add sauce and juice to line.

Makes Big Strides in Apple Processing

Processor spurts output by streamlining production lines and using latest equipment. Also achieves most profitable utilization of raw material

JOHN V. ZIEMBA
Assistant Editor, "Food Industries"

Careful planning set the stage for the successful expansion of enterprising Knouse Foods Cooperative, Inc., Peach Glen, Pa.—a two-year old firm that has already become one of the country's largest apple processors.

This grower-owned, grower-operated organization now has plants at Peach Glen, Chambersburg, Scotland, and Orrtanna, Pa.

Back of this planning have been three objectives: (1) Efficient, continuous operation designed to increase production; (2) most profitable utilization of apples through production of a wide variety of products; and (3) attainment of highest quality through minute detailing in safeguarding quality.

Productivity was raised by adopting the most advanced machines, setting them up for straight-line operation, and making refinements in processing technics. Particularly targeted were grading, washing, precooking, peeling and slicing, deaerating and blanching, ingredient-proportioning, cooking, retorting, cooling and generating (for vinegar) operations.

Better utilization of raw material is now achieved by using small apples for butter, juice, vinegar, and juice concentrate for jellies; large ones for sauce and canned slices; and pomace for pectin.

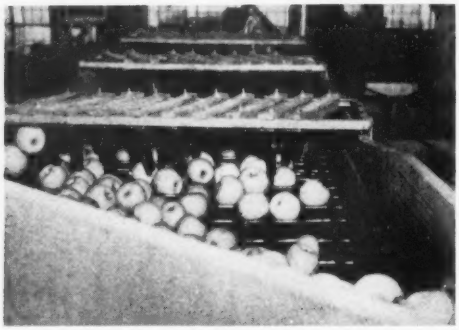
Higher quality products are assured by flume-washing, acid-rinsing, and repeated inspection of apples; brine-fluming and inspection of peeled apples and slices; vacuum-cooking of slices; rapid cooling of canned and glass-packed items; and careful control of the temperature, air flow and circulating rate of vinegar stock in generators.

At the main Peach Glen plant, apple products packed

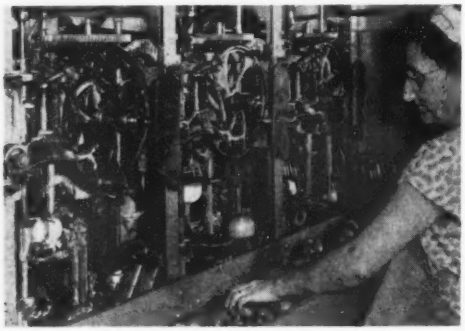
Don't Skip the Flowsheets

Graphic details of Knouse's straight-line production of canned apple slices and sauce are presented in this month's special picture foldout flowsheet—pages 136-139.
Also, an early issue of FI will "flowsheet" this company's apple butter, jelly, vinegar, pomace-drying, and juice-concentrating operations. Watch for this special "sequel" feature.

Action on Sliced-Apple Processing Line

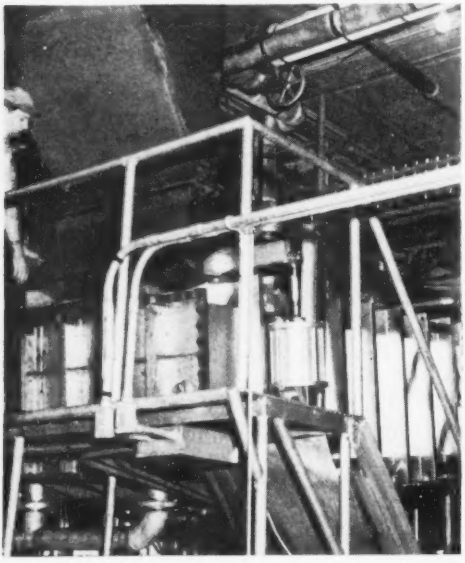


1 **GRADERS** screen apples into four sizes that go to separate peeling lines. Knives are set for each size.

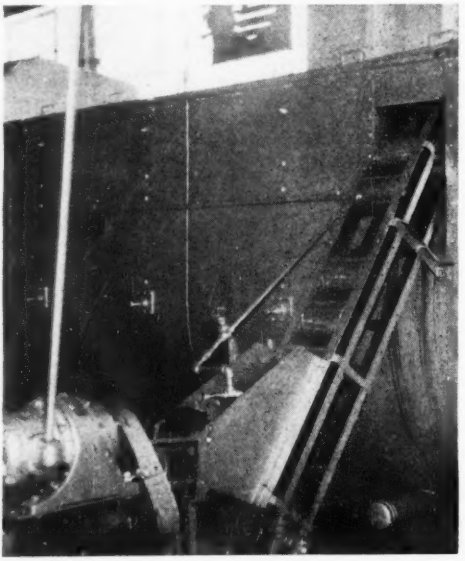


2 **TRIPLE-HEADED** peeling machine pares and cores 70 apples per min. Peach Glen plant has 30 peelers.

3 **THEN** following trimming, apples are ringed on vertical rod (arrow) and fed to radial knives that slice them.



4 **VACUUM COOKER** deaerates and blanches slices to curb discoloration, vitamin C losses, and corrosion of cans.



5 **LEAVING** filling and closing units, cans of slices go through this A. B. continuous retort. Cooling follows.

include canned slices, butter, pure jelly, combination apple-fruit jellies, vinegar, pomace, and concentrated juice. Apple sauce is packed exclusively at Chambersburg. Only the juice is put up at Scotland. And sliced apples are canned at Orrtanna.

In addition to these products, the company also packs tomato juice and pitted sour red cherries. Next season, peaches will be canned.

All plants are equipped with the most modern machines. And they have been especially designed for efficient production of quality products under sanitary conditions.

Apples are grown by over 300 members of the cooperative on 30,000 acres and trucked to the nearby plants in 50-lb. crates. Orchards are located in the Appalachian apple belt of Pennsylvania, Maryland, Virginia, and West Virginia. These orchards are under the continuous observation of the fieldmen.

Most streamlined of the plants is the one at Peach Glen. For here there is no back-tracking in production of any of the principal products—canned slices, butter, jellies, vinegar, and dried pomace.

Grading Is Continuous

Peach Glen operations will now be detailed: Field-run apples are dumped onto six parallel 30-in.-wide rubber-belt conveyors equipped with rotary brushes that level the fruit on the belts. Empty crates are immediately placed on a four-tier chain-belt conveyor that carries them to a nearby platform, where they are loaded on trucks.

Quick handling of empties in this manner eliminates congestion at the receiving platform and permits an uninterrupted flow of apples to processing lines.

First step is sampling one bushel of apples for about every 100 received. The samples are periodically collected with a manually operated gate that temporarily stops the flow of apples into the processing line and diverts them onto a flight conveyor going to the sampling station. Here, a state inspector classifies the apples according to size and examines them for defects. Growers are then paid on an impartial basis, according to the inspector's analysis.

Grading is the second step. Here, imperfect apples are separated from the incoming fruit, which is then screened into small and large sizes. Small apples go into butter, vinegar, or are pressed into juice which is concentrated and later used for jellies. Large apples are used for sauce or are sliced and canned.

The incoming apples travel over six parallel wooden roller conveyors—the inspection stations—where all inferior fruit is picked out by trained girls and placed on 6-in. wide rubber-belt conveyors. These belts take small imperfect apples to a 12-in.-deep by 12-in.-wide flume. Through it, an 8-in.-deep stream of water flows at a moderate rate, floating the apples to acid-wash tanks. Then the fruit goes to the cider-press room, to be used to make vinegar.

Meanwhile, good apples continue onto 2¼-in. mesh screens, through which smaller ones fall onto rubber-belt conveyors. Depending upon the total volume of apples received and the amount of undersized fruit, movement of small apples at this stage may be in two direction: All may continue directly to the apple-butter line, or portions may go to process and to storage.

This is how such flexibility is attained: (1) All six rubber-belt conveyors are converged into a single belt that feeds the apples into a second flume going to washing and rinsing stations and later to the butter line; or (2) any of the conveyors can be used to divert the apples to chutes, where they are repacked into crates and then conveyed directly into a 200,000-bu. cold storage room—one of the 30 storage facilities available to the company. Stored apples are later dumped into the flume taking them to the butter line.

Apples are stored, at 30 to 32 deg. F. and 85 to 88 percent relative humidity, in a cement block, cork-insulated room, cooled by a combination coil-blower unit.

During the season, this plant handles 30,000 bu. of apples a day. Of this amount, 12,000 bu. go directly into production and the remainder into storage.

Now for a step-by-step account of the apple-slice line:

Large apples that pass over the screens are used to make canned apple slices for pies. Average daily production per 9-hr. shift is 5,200 cases of six No. 10's. To produce this amount, approximately 8,000 bu. of fruit are processed.

Leaving the grading belts, the apples converge onto a large conveyor that takes them to a third flume, going to another washing and rinsing station. Some of the large apples are also repacked into crates and conveyed into cold storage.

Spray Residue Removed

Flumed apples drop onto a wire-mesh conveyor directly above a 1,000-gal. wooden tank in which the water is collected and re-used—the water is then pumped into the flume at the grading station. Apples continue into a flotation washer. As they are carried through the 6 by 30-ft. wooden tank, four wooden, horizontal rotary paddles keep them submerged in a 1 percent solution of HCl. This acid solution removes spray residue from the apples.

From the acid-bath, apples are chuted into another wooden tank in which acid is removed from them by fresh water. Here, two wooden horizontal rotary paddles also keep the apples submerged as they travel through the fresh water bath.

A second inspection follows. After the apples leave the rinse tank, they go on to another wooden-roller inspection conveyor (2½ by 14 ft.). Here, they are re-examined for defects.

A flight conveyor then lifts the apples onto a horizontal rubber-belt conveyor that feeds them onto three continuous graders, operating in series. At this point, the apples are screened into four sizes—2¼ to 2½ in., 2½ to 2¾ in., 2¾ to 3 in., and the largest sizes. Apples passing through the three different size mesh screens fall onto conveyors that carry them to peeling lines. Each line is equipped with triple-head, high-speed peeling machines. Total production on all lines is 6,000 pared and cored apples per hour.

Screening of the apples into the different sizes is a

About Varieties Used

From the apple belt, Knouse gets five varieties—York Imperial, Stayman, Grimes Golden, Golden Delicious, and Rome Beauty.

The *York Imperial*, discovered near York, Pa., in 1820, is juice- and flavor-laden. It is tops for cooking because it holds its texture and retains its flavor.

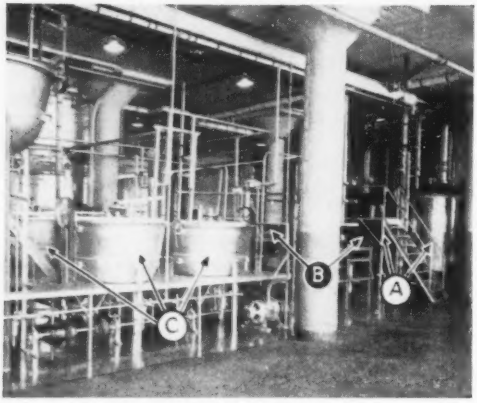
The *Stayman* is a favorite of apple-wise chefs and pie-bakers. It has a highly pleasing flavor and its close-knit, white flesh has a delicate tartness. The Stayman is a chance seedling of the famed, old-time Winesap, found near Leavenworth, Kan., about 1875.

The *Grimes Golden* is a chance seedling discovered in West Virginia about 1800. It is an apple of outstanding delicate flavor.

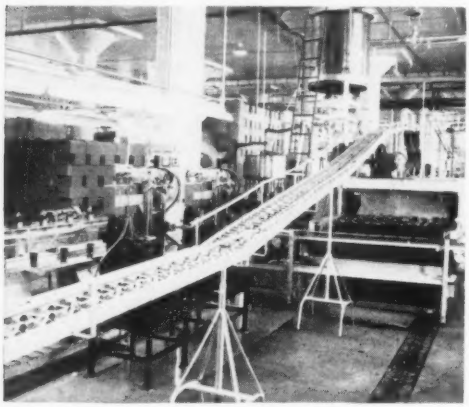
The *Golden Delicious* was also found in West Virginia about 1912, and it lives up to its name, having a rich, satisfying flavor and solid, juice-filled flesh.

The *Rome Beauty* is one of the best apples for all-around use. It retains its good flavor and body during cooking.

Line "Doubles" for Butter and Jelly



IN making apple butter, crushed apples coming from hammer mill go to digesters (A), pulpers (B), and cooking kettles (C). Jelly process begins at cooking kettles.



FOLLOWING filling and capping, jars of butter or jelly go through continuous cooler, in which they are cold-water sprayed. Quick cooling retains color and flavor.

notable improvement. First, this increases the yield of peeled apples, and second, it steps up production, since the blades of the automatic paring knives on each peeling line do not require adjustment as the size of the apples changes.

How Apples Are Pared

In the mechanical peeling, each apple is placed on a cup that swings it under a 3-pronged spindle that penetrates and grips, then rotates the fruit for paring. As the apple turns about its core, a hinged of "floating" peeling knife follows the contour of the fruit and removes a narrow strip of peel. At the same time, a circular coring knife takes out the stem, seeds, and calyx.

The peeled apples fall on a short conveyor, where they are trimmed—the third inspection. Bits of skin, bruises and defects remaining in the fruit are removed.

Slicing is next. Peeled, cored apples are ringed on a stainless steel, vertical rod. Next, a two-pronged arm intermittently forces the apples off this rod and through horizontal radial knives that cut them into 1-in. segments. Slices then drop into another brine flume to be carried to a ¼-in. mesh shaker screen. Brine is used to retard browning of the slices.

Small pieces of apples pass through the screen, drop into a small stainless steel tank, and are then brine-flumed to a wire-mesh belt directly over another tank in which the brine is collected and re-used. Apple pieces continue to a hammer mill subsequently feeding the apple-butter line.

Slices are conveyed to another trimming belt—the fourth inspection. At this point, slices not conforming to standards are flumed to the cider-press room. Those slices passing inspection are immediately chuted into three vacuum-cookers, operating in rotation to provide almost continuous production.

Vacuum Treatment

Deaeration and blanching—quality control measures set up by Knouse technicians—are carried out in these cookers at the same time.

Oxygen is removed from the slices for three reasons: (1) To prevent losses of vitamin C, (2) to reduce discoloring during subsequent processing and storage, and (3) to avoid serious corrosion of the tin plate, which eventually causes can perforations and hydrogen springers.

Slices are also blanched to soften them so that they can be packed tightly into cans without breaking and to get a higher drained weight.

Into each cooker, batches of approximately 750 lb. of sliced apples are chuted from the inspection belt onto a wire-mesh conveyor that fills the unit. Slices are next subjected to a short steam blanch under vacuum. Steam is then turned off and the vacuum is released. Finally, the conveyor inside the cooker is started to discharge the slices onto a rubber-belt conveyor, feeding No. 2 and No. 10 can-filling machines.

Apple slices are now automatically filled into steam-sterilized cans together with a measured amount of sugar syrup. These cans then pass under a series of hot water sprays so that spaces between slices are filled with liquid to insure complete removal of entrapped air. Cans continue to a compression belt where the slices are pressed into the tins to obtain the proper drained weight.

Sterilizing and cooling are the final steps on the canned, sliced apple line. After the cans are machine-sealed, they go to an Anderson-Barngrover continuous open cooker, where they are heat-processed for 15 min. in a 190-deg. F. water bath. A reel gently rotates the cans through the hot water bath.

From the cooker, cans continue to an A. B. continuous atmospheric cooler—a unit similar in design to the cooker. In this cooler, the cans are also gently agitated by a revolving reel as they travel in a cold water bath. Cans are finally labeled, cased, and conveyed to the finished goods storage room.

Notable savings in man-hours have been achieved by the continuous cooker and cooling units, which require only one man to operate them. Eliminated are loading and unloading of cans into retort baskets, transfer of baskets to and from retorts, cooling tanks, and stacking of unloaded cans for labeling.

Other advantages of continuous cooking and cooling are the achievement of shorter sterilizing time, greater production and improvement in flavor and appearance of the product.

Making Apple Butter

Now let's go back and pick up on the apple-butter line:

As stated, small apples are flumed from the grading station onto a wire-mesh conveyor over a wooden tank. Water is pumped back to the flume at the grading station and apples continue through the acid-wash and water-rinse tanks. Next, the cleaned apples go onto a rubber-belt

conveyor, where they are inspected before they enter a horizontal hammer mill. Here, they drop on beaters mounted on a shaft. Comminution continues in the mill until the apple product is fine enough to pass through a ⅛-in. perforated plate.

From the mill, crushed apples fall first into a hopper, then onto a horizontal conveyor that delivers them to a continuous precooker. Another conveyor carries the ground apples through the live steam cooker, where they are treated and thoroughly softened. A positive displacement pump feeds the cooked apples into a screw-type pulper, equipped with 0.052-in. dia. screens that remove seeds and skins.

Pulped fruit is now pumped into 250-bu. stainless steel digesting tanks with steam coils—for 1 hr. of cooking under 30 psi. In addition to concentrating the pulp, these digesters bring it to the desired color.

Another positive displacement pump delivers the concentrated pulp into 150-gal. stainless steel steam-jacketed kettles with verticle paddles. At this stage, spices, liquid sugar, and fruit acids are added. Liquid sugar is pumped in from four 4,000-gal. storage tanks

To doubly assure freedom from seeds and skins, the hot butter is pumped through another screw-type pulper. From this unit, the butter goes to 75-gal. stainless steel holding tanks, thence to be fed to a machine that fills six jars at a time. Capacity of the filler is 125 jars a min.

Jars of butter go to a capping machine before they are fed, for cooling, onto a 40-ft. long wire-mesh conveyor traveling at approximately 2 ft. per min. While moving on this belt, the jars are sprayed with a fine mist of cold water from nozzles above and below the conveyor. Thus jars are cooled to 100 deg. F. or below. Finally, they are automatically labeled and cased.

How Jellies Are Made

Pure apple jelly—also apple jellies that contain elderberry, cherry, raspberry, and grape juices—are prepared on a portion of the butter line. Average production on the jelly line per 9-hr. shift is 2,700 cases of 12-oz. jars—24 jars to a case.

Concentrated apple juice, sugar, and pectin are introduced into stainless steel cooking kettles. Other fruit juices are included when combination apple-fruit jellies are to be manufactured.

The mixture is next cooked to a 68-percent soluble solids content. Finally, jars are capped, spray-cooled, labeled, and cased.

Vinegar-Making Controlled

In making vinegar, acid-washed small apples are crushed in a hammer mill and hydraulically pressed under 3,000 psi. Next, the juice is pasteurized before it is pumped into fermenting tanks. Pasteurization prevents fermentation by undesirable yeasts. Pure yeast cultures are added and fermentation proceeds until a maximum amount of alcohol —determined by laboratory tests—has been attained.

Vinegar stock is then filtered, heated to 85 deg. F., innoculated with special strains of acetobacter organisms, and transferred to circulating-type generators. Here, the alcohol is converted into acetic acid as the vinegar stock percolates and re-circulates through the generator. Periodic checks are made on the acid and alcohol content of the stock.

Temperatures of the generators are recorded by electronic indicators, six to a generator. The correlation of air flow and recirculation rates (indicated by flowmeters) with temperatures enable attendants to maintain optimum conditions for manufacturing vinegar in the generators. All electronic temperature indicators in each generator are connected to a master recorder to permit attendants to determine the temperature at any of the six points in the five tanks.

If the temperature is too high—above 85 deg. F.— then the vinegar stock is cooled in heat exchangers. Here, too, the temperature and flow rate of the stock are controlled by attendants. Also controlled are the amount and the temperature of the cooling water in the heat exchangers.

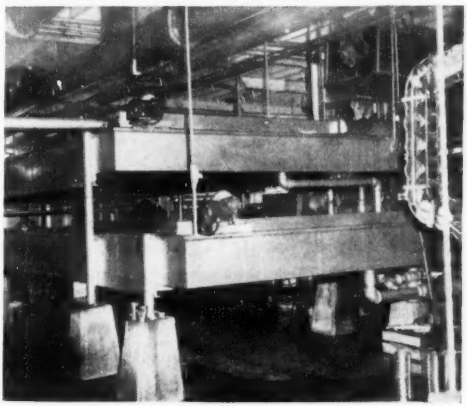
Air is also metered into the generator so that oxidation of the alcohol can be carried out more efficiently.

After oxidation has been completed, the vinegar is pumped into 30,000-gal. aging vats, where it is permitted to mellow. In this treatment, sharp-tasting aldehydes are oxidized into tart organic acids and the small amount of residual alcohol reacts with organic acids to form aromatic esters. The vinegar is finally pasteurized for 15 sec. at 160 deg. F. and then filled into quart bottles at the rate of 60 per min.

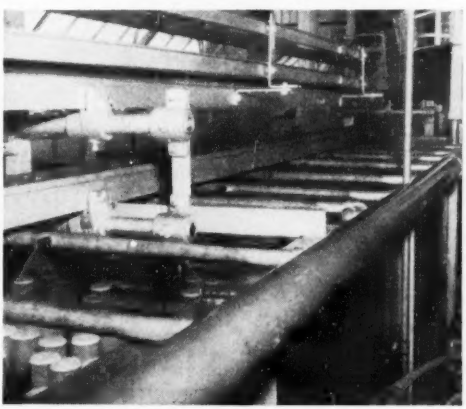
Except for wooden presses, vats, and generators, stainless steel pipes and equipment are used throughout the entire vinegar-processing line. Iron is particularly avoided, since it forms undesirable iron-tannates that cloud and discolor the vinegar.

Pomace remaining from the pressing operation is dried in a 24-ft. long and 6-ft. dia. unit that rotates at 3 rpm.

Continuous Units Speed Sauce Cooling



DOUBLE-DECK COOLER handles No. 2 and No. 10 cans. Rolls rotate cans through circulating cold water.



COMPANY-MADE UNIT is for glass jars of sauce. Cooler comprises 130-ft. slatted belt with series of water sprays.

Capacity of the dryer is 1,000 lb. of dried pomace per hour. Leaving the dryer, the pomace is bagged and shipped to pectin-processing plants.

Continuous Sauce Line

The manufacture of apple sauce at the Chambersburg plant will now be described: Apples are trucked to the plant, where 9,000 bu. are handled in two 9-hr. shifts.

First off, the apples go to eight grading lines. About 1½ percent of the load are small apples that pass through 2¼-in. mesh grading screens are flumed to the juice-concentrating plant.

Only large apples are used to make the sauce. They are flumed to acid-washing and water-rinsing tanks. A flight conveyor then lifts the fruit onto a horizontal rubber-belt conveyor that feeds 30 triple-head peeling machines.

Peeled apples fall into another brine flume that delivers them to a wire-mesh conveyor, located directly over a 500-gal. tank. Brine caught in this tank is pumped back into the flume. Next, the apples go to a 30-in. wide and 38-ft. long conveyor, where 45 to 50 girls trim and inspect them.

Trimmed apples are then conveyed to a chopper that cuts them into ⅛-in. slices. These drop into a small brine tank, from which they are pumped through a 4-in. dia. pipe to a rotary separator with ⅛-in. mesh screens. The brine is re-used.

Cooking Improved

Next step is continuous cooking—an outstanding mechanical and engineering improvement. Sugar goes from a hopper into a screw conveyor which feeds into another worm-screw. Sliced apples are also fed to this conveyor. Mixing takes place in this screw before discharge into the hopper feeding the continuous steam cooker. Here, the sauce is cooked at 230 deg. F. for 2½ min. as it is screw-conveyed through the unit. All conveyors have variable-speed drives.

Syrup is sometimes used in place of bulk sugar. The liquid sugar is proportioned by a manually adjusted centrifugal pump from a 24,000-gal. tank into the hopper feeding slices to the screw conveyor.

Frequent checks are made by the laboratory on the soluble solids content of the sauce discharged from the cooker. If there is any deviation from the 28-percent soluble solids level, then the speed of the sugar conveyor is immediately changed.

From the cooker, the sauce goes into a continuous pulper, equipped with screens for removing large lumps and seeds. The 200-deg. F. sauce is then either put up in No. 2 and 10 cans or is filled into 8 or 17-oz. glass jars.

Cooling Is Rapid

After machine sealing, the cans go to a continuous, double-deck, Rex Therm-Roto cooler—the No. 2's on the bottom and No. 10's on the top decks. Here, the cans are cooled in 5 min. as rolls rotate them through a bath of circulating water.

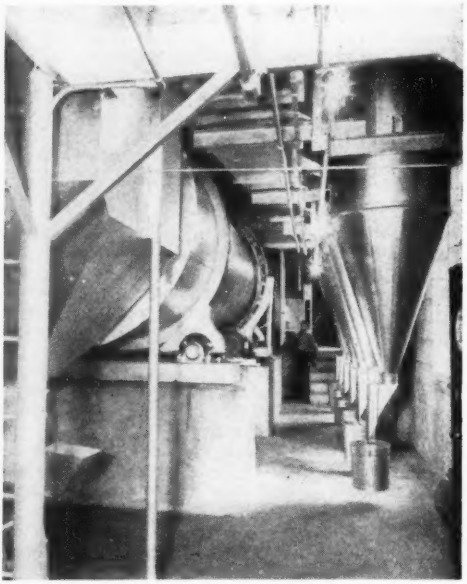
Rapid cooling of canned sauce by this method checks the action of prolonged high temperatures and overcooking and thus maintains the desired color, flavor, and texture of the product. Other advantages of cooling by this system are savings in time, labor, water, and floor space.

Sealed jars of sauce are cooled to about 100 deg. F. on a 130-ft. wooden, slatted conveyor, equipped with a series of water sprays spaced a foot apart. Water from this cooler flows into a 15,000-gal. underground tank and it is then re-used for flume-washing unpeeled apples.

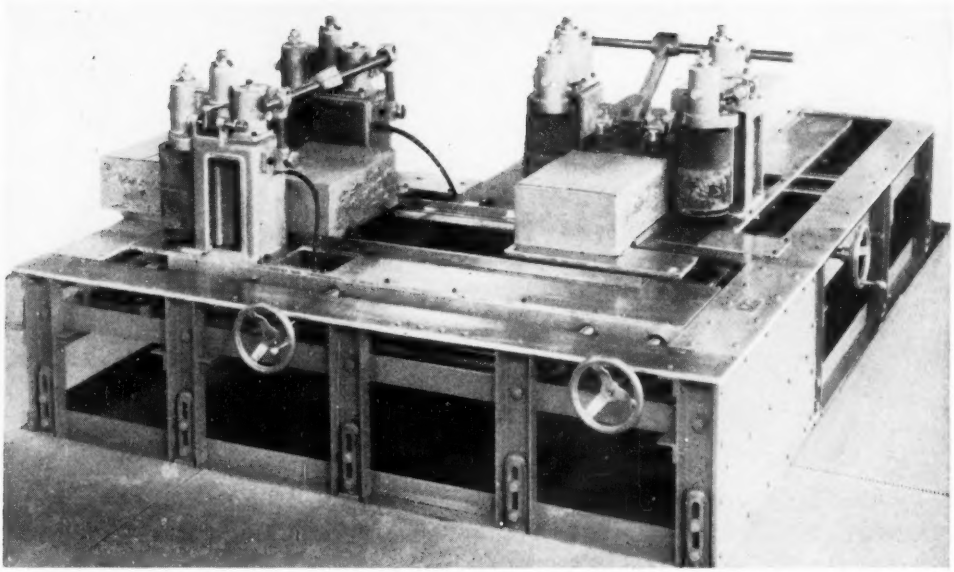
Cans and jars of sauce are finally automatically dried, labeled, and then machine-packed into cases.

Small Apples Go Into Vinegar, Peelings Into Pomace

LATEST methods are used to make vinegar in these generators featuring electronic temperature bulbs throughout. Bulbs are connected to a master recorder, where temperatures of vinegar stock can be observed and corrected.



POMACE from hydraulic cider presses is dried in rotary unit (left). Dried pomace is finally packed in 100-lb. bags and shipped to pectin-extraction plants. Large cyclone separators (right) remove fine dust.



Specially designed to put legends on all four panels of "shippers", this versatile, 4-header unit—

Prints Cases as You Use 'Em

And thus time, labor, and space are saved because there's no need to keep a large stock and variety of pre-printed shipping containers

BY PRINTING its shipping cases as it uses them, a large midwestern food processor has greatly simplified his container-inventory problem.

Formerly, this processor had to stock no less than 75 kinds of pre-printed cases. For he was turning out 25 varieties of products, and each one required three different size containers. Thus, possibilities for trouble were high. If this multi-variety inventory was not carefully and systematically checked from day-to-day, production schedules would be difficult to maintain.

But now, regardless of what the production schedules call for, plain unprinted cases are used for whatever product is being packed. The new machine automatically prints legends on the four panels of each packed shipping case.

Many Benefits

Aside from making it easier to keep an inventory on cases, the new system has a number of other advantages: Less labor is needed to keep tabs on inventory, floor-space requirements are greatly reduced, and costly delays in servicing the production department with shipping cases have been curtailed.

This "print 'em as you use 'em" simplification of the inventory problem, with its attendant savings in time, labor, and floor space, was made possible by a new machine known as a 4-header case printer. Developed by Adolph Gottscho, Inc., Hillside, N. J., it is a highly versatile unit designed to print all four panels—and even the top panel, if desired—of each packed case coming in on the conveyor. Cases do not have to be sealed before reaching the new printer—a feature that permits its line installation either before or after the case sealer.

In addition, this machine can be quickly changed to handle cases widely varying in size and to print different legends on them. Size range of a typical machine is: Length, 6¼-18 in.; width, 6½-15 in.; and height, 3-10 in.

Machines are custom-built to meet the exact requirements of the food processors—particularly tailor-made to handle cases of varying sizes.

Change-over time from one size case to another takes only 2 to 3 min. All that an operator has to do is turn three hand-wheels on the sides of the machine to adjust angle bars guiding the cases on a chain-flight conveyor past two printing stations.

Legends can also be rapidly changed. There are two methods. The quicker and more accurate way is to permanently mount the dies on the rotary die-wheels so that entire wheel assemblies can be interchanged at will. The other way is to maintain the same die-wheel but to replace the dies. This may be done in a matter of a few minutes. Here, the dies are held on the die-wheels by adhesives.

How New Machine Works

In operation, the machine picks up the plain, filled containers (coming from an automatic case-sealer or a hand-packing station) on a chain-flight conveyor that spaces them out as they approach the first printing station, where the two side panels are simultaneously printed. From this printing

(*Turn to page* 220)

Trucks Deliver Them Alive

Saving close to $150 per shipment, lobsters are hauled from Portland, Me., to New York City three times weekly, supplying company's major market

FOR SIX years now, the Maine Lobster Co. has been shipping live lobsters from its plant in Portland, Me., to the New York City market by motor trucks. They have found it to be cheaper and faster than by any other method.

The two Dodge 1½-ton panel trucks used in this unusual food distribution method make three trips each per week with an 84-barrel load on each trip. The saving in transportation cost is $147 on each run, as compared with the previous method of shipping by railway express.

12-Hour Delivery

By truck, the 340-mile journey from Portland direct to the New York City commission merchant is made in 12 hours, or at an average rate of slightly less than 30 mph.

By rail from Portland through Boston to Grand Central Terminal in New York City is an overnight run of from 9 to 10 hours. Loss of time in the transfer from Grand Central Terminal to the plant of the commission merchant, however, had added up to more overall shipping time than the 12 hours required by truck. The Maine Lobster Co. states that the cost is approximately $1.75 per barrel more by rail than by truck, and with the 84-barrels carried per truck load, this totals $147 per trip.

Year-Round Job

The shipment of lobsters is a year-round business and the unusual part of this food operation is that the lobsters must be received alive at the destination point. In the terms of the trade, the consignees prefer to see the lobsters "come out fighting" when the barrel is opened. In fact, the more belligerent the lobsters the more anxious are the consignees to take the entire shipment and the more willing to pay a top price.

Lobsters are not salable when dead. Hence every precaution is taken to keep them alive until they are ready to be cooked. These precautions begin when the lobster is caught in the fisherman's trap and the trap hauled into the fisherman's boat. Brought as quickly as possible to the waterside shipping plant, the lobsters are placed in "seasoning" tanks of running salt water. Here they are allowed to feed and rest before beginning their trip to market.

Once out of their natural element of salt water, even greater precautions are taken. The method of shipping employed by the Maine Lobster Co. is to place the lobsters one on top of another inside a cylindrical barrel. The barrel is then set inside a tall rectangular outer box. The space between the outside of the cylindrical barrel and the inside of the rectangular box is filled with fresh-water ice.

With covers placed on them, the rectangular boxes are stacked in the truck and the load is on its way to market. As the ice melts, it drains off through holes in the bottom of the shipping box onto the floor of the truck body and thence through other drain holes onto the highway.

Iced Only Once

The ice put into the shipping cases provides a sufficient factor of safety to get the lobsters to New York City in prime condition. No re-icing in transit is necessary. Arriving at the plant of the commission merchant, the lobsters are kept under similar ice refrigeration until they are delivered to hotel, restaurant, fish market, or home.

Once they are without the ice refrigeration, the lobsters will die. Hence

the need to avoid all delays in transit and to select the quickest method of distribution. To assist in retaining the ice refrigeration in even the hottest summer weather, the Maine Company's truck bodies are insulated all around with 3 in. thickness of Fiberglas.

At present, approximately 75 percent of the company's lobsters are shipped by truck, 5 percent by air, and 20 percent by railway express. The only city served direct by motor truck is New York, where the demand is large enough and steady enough to set up the three-trips-per-week schedule now in force.

Also Uses Planes

In addition to the Portland source of supply, the company brings in about 1,000,000 lb. a year from Canada by means of a chartered plane. The cost of this air supply is the same as by rail, but the air delivery time is 26 hours less and eliminates the 7 percent average rail loss in weight due to shrinkage.

In keeping with the trend to paint truck bodies hauling food products some light color to denote cleanliness, the Maine truck bodies are painted a light gray. The driver's cab and the engine hood are green. The fenders, splashers and wheels are painted black. When fenders and splashers are scratched or dented, they can be touched up easily without need to repaint the whole surface to avoid showing the difference between the old and new paint, which occurs with all paint colors except black.

As for the lettering on the trucks, it is of gold leaf with a red outline.

The body has double rear doors to help retain the refrigerated air generated by the melting ice in the shipping containers.

Loading Method

The filled cases of lobsters are loaded into the truck body off the Portland shipping plant floor by means of a chain hoist running along an overhead beam. This equipment moves the loaded cases from alongside the seasoning tanks and weighing scales direct to the rear end of the truck. Here they are swung toward the open end of the truck body and then lowered and pushed inside onto the body floor.

While the above loading method is effective, the lack of a loading platform at the level of the truck-body floor presents a situation where a vertical loading lift, such as described on pages 74 and 75 of November 1950 FI, or a self-elevating tailgate on the truck itself, would speed up both the loading and unloading.

Considering the loading and unloading at both ends of the route—the loading of full cases at the Portland shipping plant and the unloading of the empty cases brought back by the trucks, and the unloading of full cases and the loading of empty ones at the commission houses in New York City—a vertical lift at Portland might be more desirable if all the New York City loadings were on and off platforms.

But if sidewalk deliveries have to be made in New York City, then the truck elevating tailgate would seem more desirable because it would speed up both the loading of the full cases at Portland and their unloading at New York and the reverse operations on the empty cases.

Either the vertical platform lift or the elevating tailgate would perform the vertical lifting function of the traveling overhead hoist at Portland and permit its elimination, provided either a manual, or better yet, a mechanical hand truck, were used to supply the horizontal function of moving the loaded cases from the seasoning tanks to the ends of the trucks.

These conjectures, of course, assume that the dollar volume of the shipments and the labor-time involved would justify the financial outlay for the equipment.

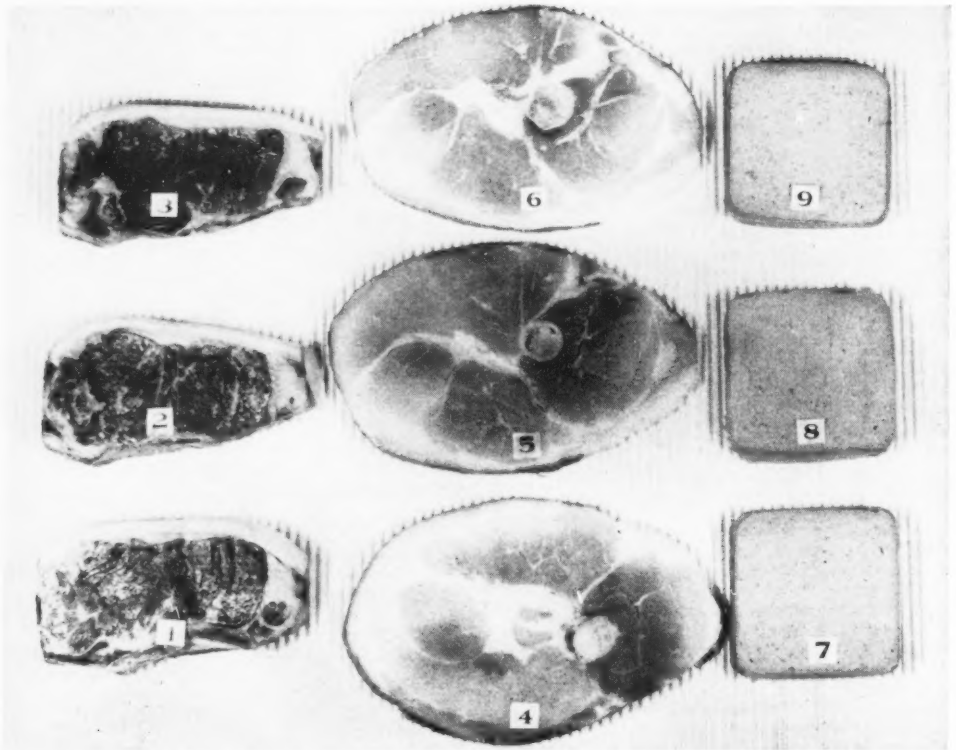
First: A Boat Ride

CAUGHT in haddock-baited traps, the lobsters are taken to the shipping plant as rapidly as the fisherman's dory will carry them.

Finally: The Weighing Scales

WEIGHED-IN just before packing in ice to be sent on their way, the lobsters have passed through "seasoning" tanks where they were fed and rested.

Influence of Lamps On Colors of Meat Cuts



BEEF STEAK (1), ham (4), and sliced bologna (7) retained good color when not exposed to light. "Soft White" fluorescent lamps didn't change color of steak (2), but did alter color of ham (5) and bologna (8). Germicidal ultra-violet lamps discolored steak (3) but only slightly changed color of ham (6) and bologna (9).

HOW LIGHT DISCOLORS MEAT: What To Do About It

Fading and subsequent flavor losses can be avoided if you attack the problems of display lamps, light intensity, exposure time, and wrapping materials. Freezing of products, filtering of u-v rays aren't answers

J. M. RAMSBOTTOM, P. A. GOESER, and H. W. SHULTZ
Swift & Co. Research Laboratories, Chicago

Self-service merchandising of packaged meats has served to emphasize some of the problems confronting the processor and the retailer. One problem is the discoloration of meats by light.

In self-service merchandising, packaged meats become their own salesman. Sales tests have shown that if other conditions are equal, meats in transparent wrappers outsell those in opaque packages. Thus, it is important to retain the bright color and natural appeal of fresh, cured, smoked, and table-ready meats while they are displayed in transparent packages.

Natural bright colors of fresh meats range from the light cherry red of beef to the delicate pink of veal. These bright colors occur when freshly-cut meat surfaces are exposed to air for a short time. The oxygen of the air combines with the tissue myoglobin to produce a bright-colored pigment, oxymyoglobin. This is the color which must be developed and maintained for best display of fresh meat.

If a transparent wrapper is used which is not permeable to oxygen, a dark color will soon develop because of the reduction of oxymyoglobin to myoglobin. Proper fresh-meat packaging materials, which include special cellophane and Pliofilm, allow passage of oxygen to maintain the desired color. These air-permeable films also restrict loss of moisture from meats and development of the dark color associated with drying of the meat surfaces.

Fresh meats are not materially dis-

colored by display-case lighting during a three-day period. Longer display periods may bring about discoloration, primarily a factor of microbiological development.

Contrasted with fresh meats, those that are cured, smoked, and table-ready present a different problem. The best display color of processed meats is the bright pink or red observed immediately after cutting. Unfortunately, this bright, attractive color changes rapidly to gray and brown shades when products are displayed under light. This color change is the result of the oxidation of the pink colored nitric-oxide myoglobin and nitric-oxide myochromogen which were produced during the processing of the meat. This oxidation proceeds slowly in the absence of light. Light acts as a catalyst, and the discoloration is proportional to light intensity.

For example, strong sunlight can produce considerable graying in less than 30 min. When newly-cut slices are displayed alongside exposed slices, the contrast may be sufficiently pronounced to be a disturbing factor in consumer purchases. Furthermore, discoloration of this kind is accompanied by the development of off-flavors in processed meats.

Swift & Co. Research Laboratories have conducted a series of studies pertaining to the effects of light on meats as described in the following text:

Observations were made on the light intensity in store aisles and self-service display cases of twelve supermarkets. All aisles and display cases were illuminated with fluorescent lamps. The light intensities were gaged with a Weston foot-candle light meter. Measurements were made in aisles 3 ft. above the floor and in cases at the level of meats on display.

Results Briefed

1. Lamps vary in color rendition (color reproduction) of meats. "Cool White Deluxe" and "Soft White" fluorescent lamps and the incandescent tungston-filament lamps gave good color rendition in the tests.

2. Display-case lighting does not significantly discolor fresh meats—beef, pork, lamb, and veal—within the usual display periods, varying from less than 1 hr. to 3 days.

3. However, lighting in a display case readily fades the color of sliced cured, smoked, and table-ready meats—ham, bacon, bologna, and loaves packaged in transparent air-permeable films.

4. Light intensity of 60 foot-candles for about 1 hr. is minimum exposure that causes noticeable fading in representative meats of this type. Exposure for 4 hr. or more brings about objectionable fading.

5. Incandescent tungsten-filament lamps fade these meats as quickly as do fluorescent lamps, given the same light intensity.

6. Filtering out the very small amounts of ultra-violet rays emitted by fluorescent lamps does not lessen the discoloration of these meats, if the light intensity is not changed.

7. Fading of meats is proportional to exposure. The same end-point is reached by holding light intensity constant and increasing time of exposure, or by keeping the time interval constant and increasing light intensity.

8. Display of these meats in the frozen state does not reduce their susceptibility to fading by light.

9. Discoloration upon exposure to light is limited to the top layer of sliced meats or to the exposed surfaces of large pieces.

10. Discoloration of these meats is caused by oxidation of their natural pigment (nitric-oxide myoglobin).

11. Deterioration of flavor accompanies discoloration.

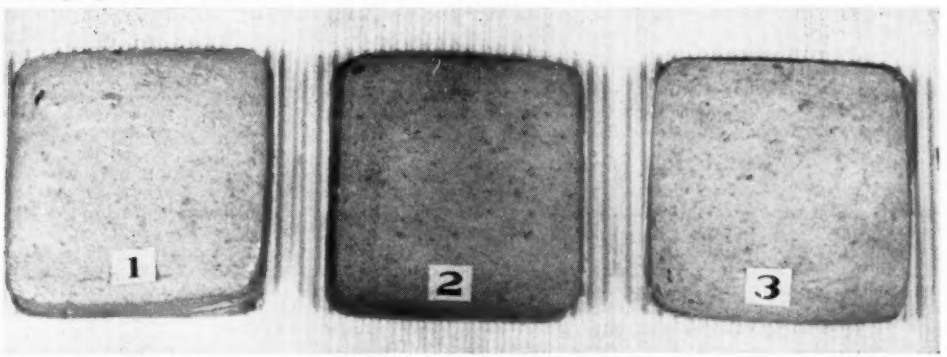
12. Means of control: Assuring quick turnover sales, inserting an opaque label on the surface of the package exposed to light, or using oxygen-free packages.

Data in Table I show that store-aisle illumination ranged from 20 to 70 ft.-c., as compared with 10 to 200 ft.c., in display cases. The average light intensity in self-service display cases was approximately 60 ft.-c. In many of the twelve markets, the store illumination was just as bright as the illumination on meats in display cases.

Color Rendition by Lamps

Observations were made on the color of representative sliced fresh, cured, smoked, and table-ready meats exposed

Packaging Films May Also Be Factor



SLICED BOLOGNA wrapped in semi-moistureproof cellophane (1) kept its bright color because exposed surface had been protected by a printed, thermoplastic, paper label. Package had been held 10 hr. under "Soft White" fluorescent light of 60 ft. c. intensity. But without such paper-label guard, cellophane-wrapped bologna (2) darkened when exposed under same conditions. Saran (oxygen-free) wrapped bologna (3) retained its color.

Data Disclose Effect of Light On Displayed Meats

TABLE I—LIGHT INTENSITIES Vary In Store Aisles and Self-Service Display Cases

Store No.	Lighting in Aisles at 3 Ft. From Floor (Footcandles)	Lighting on Meats in Display Cases (Footcandles)
1	20–40	40–75
2	50–70	40–110
3	35–60	55–90
4	50–70	40–60
5	40–60	60–90
6	40–60	50–200
7	30–45	10–200
8	30–45	30–150
9	35–50	40–80
10	40–60	40–70
11	35–60	60–120
12	25–40	55–90
Average Readings	36–55	43–111

TABLE II—COLOR RENDITION and Efficiency of Lamps

Identity of Lamp	Wattage	Light Output Lumens	Light Efficiency[1]	Relative Efficiency[2]	Rating for Color Rendition of Meats
GE Incandescent, Tungsten Filament	100	1620	16.2	32	Good
GE Fluorescent, Cool White Deluxe	40	1800[3]	37.9	75	Good+
GE Fluorescent, Soft White	40	1900	40.0	79	Good
GE Fluorescent, Warm White Deluxe	40	1900[3]	40.0	79	Medium+
GE Fluorescent, Warm White Standard	40	2400	50.5	100	Medium
GE Fluorescent, Cool White Standard	40	2200	46.3	92	Poor
GE Fluorescent, White	40	2400	50.5	100	Poor
GE Fluorescent, Daylight	40	2000	42.1	83	Poor

[1] Efficiency based on lamp plus ballast of 7.5w. Ratio of output in lumens over input in watts.
[2] Relative efficiency based on a value of 100 for most efficient light.
[3] Estimated light output in lumens.

TABLE III—EFFECT OF FLUORESCENT LIGHT of Different Intensities On Color of Sliced Cured, Smoked, and Table-Ready Meats

Time of Exposure hr.	Color Rating of Meats Exposed to Fluorescent Light of 20 and 60 Ft.-C. Intensity*					
	Bacon		Ham		Bologna	
	20 Ft. C.	60 Ft. C.	20 Ft. C.	60 Ft. C.	20 Ft. C.	60 Ft. C.
0	8.5	8.5	9.3	9.3	9.0	9.0
1	7.5	7.2	8.5	8.0	8.2	7.7
2	7.8	6.8	8.0	6.8	7.7	6.7
4	7.2	6.2	6.7	5.8	6.8	5.7
8	6.5	6.0	6.5	5.5	6.5	5.3
16	6.0	4.8	6.5	4.2	5.3	3.8

* Rating System: 1, extremely poor; 2, very poor; 3, poor; 4, slightly poor; 5, borderline minus; 6, borderline plus; 7, slightly good; 8, good; 9, very good; 10, excellent. Meats were rated while being displayed under "Soft White" fluorescent light of 60 ft.-c. intensity.

TABLE IV—DISCOLORATION of Sliced, Cured, and Table-Ready Meats by Fluorescent and Incandescent Lamps[1]

Identity of Meat	Time Exposed 60 Ft.-C./Hr.	Exposed and Inspected Under Incandescent[2] Light	Exposed and Inspected Under Fluorescent Light[3]	Exposed Under Fluorescent[3] Light and Inspected Under Incandescent Light
Sliced Bacon	0	9.2	7.3	8.3
	1	8.3	6.8	8.3
	4	7.5	6.2	7.5
	16	5.8	5.0	6.5
Sliced Ham	0	8.5	7.2	8.5
	1	7.6	6.2	7.5
	4	6.5	4.8	6.0
	16	5.8	4.3	5.0
Sliced Bologna	0	8.5	7.5	8.5
	1	7.6	6.5	7.5
	4	6.7	5.7	7.0
	16	5.5	4.3	5.3

[1] Rating System: 1, extremely poor; 2, very poor; 3, poor; 4, slightly poor; 5, borderline minus; 6, borderline plus; 7, slightly good; 8, good; 9, very good; 10, excellent.
[2] 100w. tungsten filament lamps.
[3] 40w. "White" fluorescent lamps.

to different kinds of lamps. These lamps were located over a display case so that the light intensity on the product was 60 ft.-c.

In Table II, the lamps ar rated on color rendition (color reproduction) of meats. It was the unanimous vote of a committee of six judges that the new "Cool White Deluxe" fluorescent, the "Soft White" fluorescent, and incandescent-tungsten filament lamps were superior to all others tested in displaying the bright, natural colors of these meats when the light intensity at the level of display was approximately the same. There was some difference of opinion as to which of the three preferred lamps gave the best rendition.

The "Cool White Deluxe" lamp appeared to define clearly the natural white color of the fatty tissue and the natural bright-red color of the lean meat. The greater amount of red in the illumination of the incandescent and "Soft White" fluorescent lamps gave the fat a slight yellowish cast. Since fresh meats containing white fat are preferred by the trade, a slight color advantage may be gained by the use of the "Cool White Deluxe" fluorescent lamp.

"White," "Cool White," and "Daylight" fluorescent lamps appeared to mask the bright reds and pinks of sliced meats. As a result, the natural sales appeal of the meats would be forfeited if these lamps are used.

Fluorescent and incandescent lamps were rated (Table II) for relative efficiency. If value of 100 is assigned to the most efficient fluorescent lamps, then the incandescent-tungsten filament lamp has an efficiency rating of 32. It should also be noted that the "Cool White Deluxe" lamp, which has superior color rendition, has a somewhat lower efficiency than other fluorescent lamps.

Intensity and Exposure Time

Studies were made to determine the relationship between light intensity in a display case and the onset of meat discoloration.

Sliced bologna was packaged in semi-moisture proof cellophane and displayed at twelve locations in a refrigerated self-service display case. This case was 11 ft. long, 3.3 ft. wide, and 5.3 ft. high. It was illuminated with two "Soft White" fluorescent lamps, located in the superstructure. The refrigerant Freon-12, was used. Temperature of the case ranged between 32 and 36 deg. F. Objective and subjective color measurements were made at frequent intervals over a 6-hr. period.

Fig. 1 depicts discoloration curves recorded with a Beckman Spectrophotometer. The values are ratios of the spectral reflectance readings at wavelengths of 570 and 650 millimicrons. The ratio of reflectance at a wavelength of 650 millimicrons to that at 570 millimicrons has been found to correlate well with the color changes in certain types of meat products.[1]

Fig. 2 shows the discoloration curves as recorded by visual examination. As expected, the discloration is greatest and occurs most rapidly under high light intensity. It will be further noted that the greatest discoloration occurs during the first two to four hours of display under light. The similarity of the curves in Figs. 1 and 2 indicates a close correlation of the objective and subjective measurements used in this test.

In another experiment, representative sliced smoked, and table-ready meats were displayed under "Soft White" fluorescent lamps to determine the display-case life of meats exposed

Objective and Instrument Tests Check

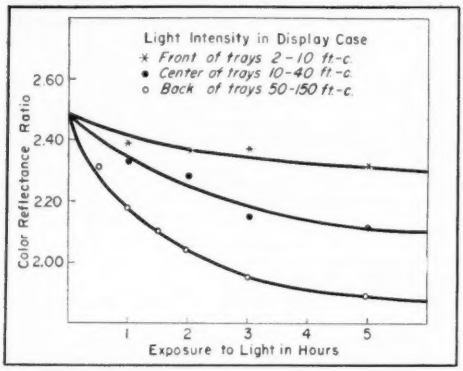


FIG. 1—FADING of sliced bologna as measured by color reflectance. Ratio: Wavelengths of 650:570 millimicrons.

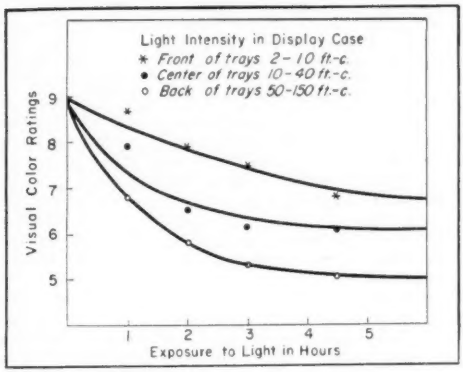


FIG. 2. HOW bologna discolored. Visual readings based on 10 for "perfect" down to 1 for "extremely poor."

to 20 ft.-c. rather than to the usual 60 ft.-c. light intensity.

Bacon, bologna, and cooked ham were put up in ½-lb. semi-moisture-proof cellophane packages and exposed for 0, 1, 2, 4, 8, and 16 hr. Temperature of the display case ranged between 32 and 36 deg. F., with an air movement of 10 to 40 fpm. The packages were rated for color by a panel of six judges. Meats in the display case were inspected twice—first under the high intensity light, and then under the low intensity light.

Since the ratings were similar, only the data recorded in the first inspection are given (Table III). It was found that the rate of discoloration of meats exposed to 60 ft.-c. was between two and three times as fast as those exposed to 20 ft.-c. In other words, meats exposed to a light intensity of 60 ft.-c. for 8 hr. received a rating comparable to, or lower than, those exposed to 20 ft.-c. for 16 hr. While these data show an increase in display-case life of meats by reducing the light intensity in the case to 20 ft.-c., it was the opinion of the panel that this intensity is not sufficient to display the meat properly.

In spectral reflectance studies made on sliced bologna, Taylor and Pracejus[2, 3] reported that the same fading will be produced by 20 ft.-c. for 10 hr. as is produced by 200 ft.-c. for one hour. Thus, discoloration is expressed in ft.-c./hr. They found that 200 ft.-c./hr. gave noticeable fading of sliced bologna.

While data in Table III are based on visual readings of color rather than on spectral reflectance, they indicate that much less than 200 ft.-c./hr. of light were required to discolor the meat in this experiment.

There has been considerable speculation as to whether certain wave lengths in the visible spectrum are primarily responsible for discoloring meats. Allen[4] reported that different portions of the spectrum of visible light are about equal in producing fading if the same light intensity is present.

Fluorescent vs. Incandescent Lamps

An experiment was conducted to determine the relative discoloration rates of representative meats exposed to fluorescent and incandescent tungsten-filament light of equal intensity.

Sliced bacon, cooked ham, and bolgna were put up in ½-lb. semi-moisture proof cellophane packages. Duplicate packages were exposed to light for 1, 2, 4, 8, and 16 hr. in a self-service case. The display case was divided into two sections—one lighted by 40w. "White" fluorescent lamps, and the other by two 100w. incandescent tungsten-filament lamps. Care was taken to avoid transfer of light from one section of the case to the other.

The following conditions were maintained in the display case: Light intensity on meats, 60 ft.-c.; temperature, 32 to 36 deg. F.; and air movement 10 to 40 fpm.

Meats were graded for color by a panel of six judges—first under the fluorescent light, and then under incandescent light. Data (summarized in Table IV) showed that meats discolored just as quickly under incandescent light as they did under fluorescent light. However, because of the greater amount of red in the incandescent light, an illusion is created which indicates less discoloration. This apparent difference is no longer evident when the packages are inspected side by side under the same light.

These data are in agreement with studies reported by Taylor and Pracejus[3], who used a recording spectrophotometer to measure the spectral reflectance of bologna exposed to "Soft White" fluorescent lamps and incandescent tungsten-filament lamps of the type used in meat-display cases. They state that within experimental errors, the fading or color change was identical under the two sources for equal exposure in ft.-c. hr.

Discoloration by Ultra-Violet Rays

Fluorescent lamps used in display cases do not emit ultra-violet rays in significant amounts, and statements to the effect that display-case discoloration of meats is caused by ultra-violet rays are disproved by experiment. By using filters to absorb ultra-violet rays, it was demonstrated that the meat discolored just as quickly with or without the filters, provided the light intensity (as measured in foot-candles) was the same. These observations are in agreement with those reported by Pracejus[2].

Ultra-violet lamps are used occasionally for their germicidal properties in rooms where meats are stored prior to display. A test was made to determine the effect of these lights on the color of sliced meats.

It was noted that sliced cured, smoked, and table-ready meats were discolored to a lesser extent by a 36-hr. exposure to ultra-violet rays (from a 30w. GE germicidal lamp at a distance of 2 ft.) than when exposed for a similar period to fluorescent light of 60 ft.-c. intensity. Conversely, fresh meats (also shown in the lead photo) were not discolored after a 36-hr. exposure to the fluorescent light, but they did change color after a similar exposure to the ultra-violet rays.

Susceptibility of frozen meats to

fading by light is similar to that of meats kept at temperatures between 32 and 40 deg. F. Frozen sliced cured, smoked, and table-ready meats are much more susceptible to light discoloration than frozen fresh meats. It was found that the rate of discoloration of frozen sliced ham and sliced bologna, when exposed to "Soft White" fluorescent light of 20 ft.-c. intensity in a self-service frozen food display case at 0 deg. F., was quite similar to rates of discoloration reported in Table II.

In similar studies on sliced fresh meats, there was very limited color fading after 8 hr. of exposure daily for three weeks.

Fading of sliced cured, smoked, and table-ready meats is accompanied by flavor deterioration. This undesirable change in flavor is limited to the exposed top slice in the package. Products like cooked ham, bologna, and meat loaves are much more susceptible to flavor change than items like bacon and smoked ham that are cooked after exposure.

Controlling Discoloration

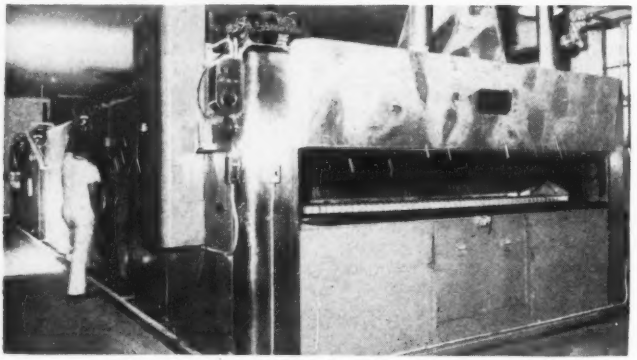
Three possible solutions to the discoloration problem in processed meats are: (1) Quick turnover in sales, (2) reduction in the amount of light and (3) control of oxidation.

Quick sales turnover is the simplest and most practical solution. The importance of this cannot be over-emphasized. In some markets, however, products may be exposed to light long enough to discolor them because of fluctuation in the volume of sales. Therefore, a constant check must be made to insure that no over-exposed products accumulate in the case. Records must also be kept to estimate how much of the various items should be sliced at any one time. Furthermore, every precaution should be taken to keep exposure to light at a minimum during slicing, weighing, packaging, and storing, because accelerated discoloration begins immediately upon exposure to light.

As for the second possible solution —reduction in the amount of light on displayed product—one method consists of protecting one surface of the cellophane-wrapped product from light with an opaque sheet or cardboard. This protective piece is printed and serves as the face of the package which is exposed to light. The second photo at the beginning of this article shows the other side of the package, which is not exposed to light. This side presents an attractive appearance.

The intensity of the light may be reduced through the use of low-wattage fluorescent tubes, by diffusers, or by entirely eliminating the display-case lamps and relying on store lighting

(*Turn to page* 222)



TRAVELING-TRAY 48½-ft. electric oven turns out 1,920 1-lb. loaves an hr.

Baker Cites *Electric* Oven Benefits

Points to uniform baking and simplified upkeep. Power charges seen favorable

J. M. BEMIS
"Food Industries" Correspondent

Trouble-free operation and uniform bake, along with the continuing downtrend in electrical power charges, dictated Silver Loaf Baking Co.'s decision to install a new continuous oven.

The Spokane, Wash., company made the decision despite the fact that, with oil-firing, present power costs for 100 lb. of baked bread may be figured at .048c., whereas electrical cost currently runs slightly higher at .0495c.

This baker points to the following benefits from his new electric oven: Uniform baking results because "hot spots" are eliminated. Some reduction in weight loss due to shrinkage is reported obtained. Temperature control is termed better, yielding bread of the desired bake and eliminating product loss due to under or over baking. Power supply is voltage-regulated on the line, not in plant. Danger of gas or oil exploding is, of course, no worry.

The maintenance saving results from not having to re-line fire box and make burner adjustments.

And the company has had no production losses because of power failures. Any outages that did occur were brief.

Oven Details

Measuring 48½ ft. long, 12½ ft. wide, and 9 ft. high, the oven is turning out 1,920 1-lb. loaves per hour on a 30-min. baking cycle. It is a traveling-tray type.

This unit replaced an older electric oven that baked 864 loaves hourly and required two men for feeding. Since the new oven needs no additional men, labor costs have been reduced considerably.

This baker quotes power figures as follows: Demand is 450 kw. Breakdown on a 76-percent efficiency basis is 307 Btu. or 90 watt-hours per 1-lb. loaf. This comes to the previously mentioned figure of .0495c. per 100 lb. of bread. Silver Loaf uses between 150,000 and 175,000 kwh. monthly and pays .008c. per kwh.

Heating elements are open coil # 12 nichrome-resistance wires, suitably protected from mechanical injury. They are located in two banks below the trays (40 trays in all). Thermostats automatically control two heating zones—front and rear. There is no mechanical separation.

Temperatures can be regulated within 5 deg. F. anywhere in the 200-to-500-deg. range. Baking cycle can be varied between 12 and 45 min. A mechanical variable speed control, rather than an electric tachometer, does the adjusting.

Rainier Electric Oven & Engineering Corp., Seattle, manufactured the oven.

We Think . . .

▪ Suggested Change in Food Law Is Dangerous and Unnecessary

Many of the experts testifying at the Delaney hearings on chemicals in foods have recommended one change in the Food, Drug & Cosmetic Act. This revision would require proof that a chemical is harmless before it be added to a food.

The consensus in the food processing industry seems to be that such a change is desirable. At the same time, there is fear that a revision may be so worded as to go beyond actual needs in restrictive effect, and therefore impede technological progress in the industry.

Fuel was added to this fear by one Delaney witness who asked for an amendment which would prevent the "debasing" of food products. This individual feels that enforcement of the provisions of Section 402-B of the Food, Drug & Cosmetic Act should not have to depend upon the seizure provision of Section 304, under which the government will have to sustain its very heavy burden of proof beyond a reasonable doubt. And he suggested that the Delaney Committee give careful consideration to the matter of requiring that a manufacturer show that his product does not lend itself to debasement or deception at the same time that he seeks to prove to the Administrator its complete harmlessness.

We believe this witness himself presented effective arguments against such a step when he indicated that it would be difficult to word such an amendment and that there is always the possibility of administrative abuse in carrying it out.

What constitutes harmlessness can be fairly definitely defined, and the type of research data required to prove it clearly specified. But we defy anyone to define "debasement" scientifically and precisely and in such a way as to secure approval of the definition among food processors, health officials and consumers.

There really is dynamite in that suggestion and a more than even chance that progress would be impeded, processors harmed, and consumers denied products which they would like to buy.

Existing protection against debasing of foods works well enough. And we hope that good enough will be let alone.

▪ Do What You Can To Help Solve Military Food Problems

As the tempo of defense preparations increases, the need to solve military food problems becomes more acute. And all food technologists and food research agencies should offer a helping hand when they can.

A lot needs to be done when you consider that the Quartermaster Corps is interested in further research and development in respect to: (1) Environmental food factors. (2) Field and operational rations—assault, combat, field, in-flight, small detachment and survival. (3) Food packaging. (4) Food products—bakery and cereal products, condiments, confections, dairy products, fats and oils, fruits and vegetables, meats and soups. (5) Food stability —browning, lipid deterioration and microbiological effects. (6) Nutritional requirements of men in the armed forces.

To solve the problems, the plan is to use civilian assistance to the fullest extent. So if you have any new research findings or new developments in any of these classifications, communicate with the Office of the Quartermaster General, Military Planning Division, Research & Development Branch, Building T-A, Washington 25, D. C. And if you are qualified and equipped to contract for research on the problems listed, communicate with the same Quartermaster agency.

Food research technologists can contribute much to the country's military preparedness program, and in so doing will also foster progress in civilian food technology.

▪ Further Research Indicated for Dehydrated Foods

Dehydrated foods are conspicuous by their absence from the major requirements of the QMC. Military food procurement officers are mindful of the GI resistance to desiccated comestibles in World War II. And they know that civilians have agreed with the fighting men. Consequently they plan to purchase no dehydrated product which does not have commercial acceptance.

In one year of the last war, no less than 240 million pounds of dehydrated fruits and vegetables was produced. At that time, 375 plants were dehydrating these products. But by the end of 1949, only 60 were in business. Later the number dropped to 35, of which 18 were wholly dependent upon ERP requirements for potato flour.

When World War II ended, there was much hope that dehydrated foods would be accepted by housewives. After all, they were infinitely better than those produced in the previous war, thanks to the trick of blanching borrowed from the freezers. And a leading food company put a lot of effort and money into producing top-quality dehydrated vegetables and fruits, using an improved dryer. After some fanfare, the firm dropped the project like a hot potato. There were two reasons: (1) There were "bugs" in the process. (2) Consumers didn't want the stuff. So ended the peacetime hope for the food industry's great war baby.

Intervening years have changed the picture little. At the recent West Coast conference on dehydration, several speakers made it clear that little progress had been made in dehydrating fruits and vegetables. One exception is the coating of desiccated carrots with starch to retain color and quality. Then some improvement has been made in dehydrated onions and diced and granulated potatoes, there being a commercial demand for these.

It would not be cricket to criticize food processors for refusing to spend research money on products with no future. But can one be certain that it is impossible to successfully produce and market dehydrated vegetables? They offer so many advantages from a distribution cost angle—and they come near enough to being good—that they ought not to be written off entirely.

The military is financing one bit of research involving

dehydration with air at room temperature, a desiccant being employed to increase the moisture capacity of the drying air. But how about trying an inert gas instead of air as a moisture absorber, or vacuum drying at temperatures above freezing? For killing enzymes and microorganisms, there may be some merit in dielectric heating or bombardment with electrons. And it now would be possible to package dehydrated foods in flexible containers under vacuum or in inert gas.

We wouldn't pretend to know the answers. But all the new tricks of food technology and engineering should be tried. And certainly more government research money could well go into fundamental scientific studies of dehydration as a food preservation process. Perhaps some now unknown physical, chemical or biological phenomenon would provide the key to better quality in dehydrated food.

The time may again come when dehydrated foods in great quantity will be needed in a national emergency.

■ Better Look Into Cost Implications of Government Contracts

Food processors who take government contracts may have to pay a higher minimum wage than 75c. an hour. Secretary of Labor Tobin is raising the minimum for work on government contracts of more than $10,000. Of 42 industries doing government business, nine are above the 75c. minimum. Tobin has moved to raise the minimum in the other 33. And he is bringing still others under the Walsh-Healey Act for the first time, including flour and cereal products, confectionery and sugar refining.

The Walsh-Healey Act calls for wages of not less than the "prevailing minimum wages for persons employed on similar work or in the particular or similar industries or groups of industries currently operating in the locality," as determined by the Secretary of Labor. The law also prohibits working hours beyond 8 a day or 40 a week unless time-and-a-half overtime is paid. Nor may boys under 16 nor women under 18 be employed on such work.

To make matters worse, the "prevailing minimum," as calculated by Secretary Tobin, is reported to be on the high side. He is criticized for relying too much on national and regional averages of straight-time hourly earnings and not enough on the actual minimum wages paid in various plants of an industry. The rates set by Tobin are final and are not subject to court review.

It is evident, then, that it pays to look carefully into the labor-cost implications of a government contract before you sign it. Otherwise you may find the cost of fulfilling the contract higher than you calculated. Furthermore, you may end up with higher labor costs for processing food for the civilian market. It is practically impossible in most food plants to separate defense work entirely from regular operations.

■ Two-Year Test of Chemical Toxicity Sets Worthy Example

Results of a long series of tests regarding the safety of a certain plasticizer for food-wrapping films were announced recently. After a very intensive two-year toxicity study and a critical investigation as to the transfer from the film to the foods wrapped with it, the company making the plasticizer prescribes methods for its use.

This illustrates very happily the sort of investigations that should be more numerous among those dealing with food packaging and food processing. And the thoroughness of the investigation merits imitation.

Recently we have seen in the bread-softener hearings, the spray-residue investigation, and the initial hearings of the Delaney Committee, great concern on the part of public officials regarding the presence of contaminants and added chemicals in foods. Any company which makes a slip and causes food contamination is likely to be the object of severe official criticism. The public reaction, too, may be quite serious. Unfortunately, every such instance causes embarassment and difficulty for a wide area of the food business, not alone the single company which made the mistake.

All glibly accept in words the responsibility for delivering "pure food," yet not all take their responsibilities as seriously as they should. Progress is important. But it will not be achieved by taking a chance with new methods or new materials that may affect public health.

Technologists Should Keep an Eye on the Labor-Relations Angle

In every modern food process, labor problems, as well as mechanical and chemical considerations, must be taken into account if the economic as well as technologic plans are to be sound. This means that the food technologist must study many of his developments with an eye to measuring both the change in man-hours required and the change in employment rules imposed by labor-union contracts.

Even the research director may find it necessary to plan his scientific and technologic programs differently because of the presence in labor contracts of certain restrictions on work assignments and changes of employment ratings.

Those who think primarily of the technical problem are not likely to become labor experts. But many in technical positions must, whether they like to or not, review from time to time the trend of employment negotiations and the technologic implications of the terms in collective bargaining agreements.

There is no easy way to get a complete understanding of these problems. But fortunately there is now available a little series of government documents which may be helpful. These are the 15 parts of Bureau of Labor Statistics Bulletin 908. In these documents one can review typical labor-contract provisions which actually are in force in collective bargaining agreements throughout the country. Not the least important of these are the ones dealing with incentive wages, time studies and standards of production, plant efficiency and technological change, health and sanitation, and guaranteed employment.

The job of the food technologist steadily becomes more complicated. It's no longer sufficient to prove to the boss that a new process will work, will improve market appeal and will make a profit. You must demonstrate that the process will not upset employment arrangements and perhaps even cause a strike. A technical man who does not want to do this job himself better be sure that someone in the employee-relations department does it for him.

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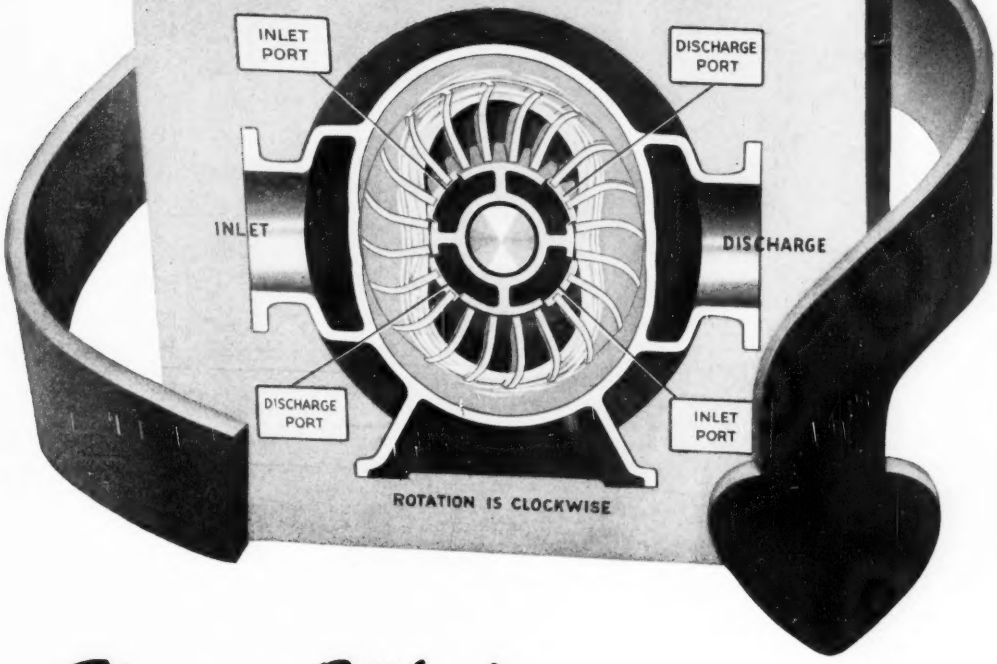

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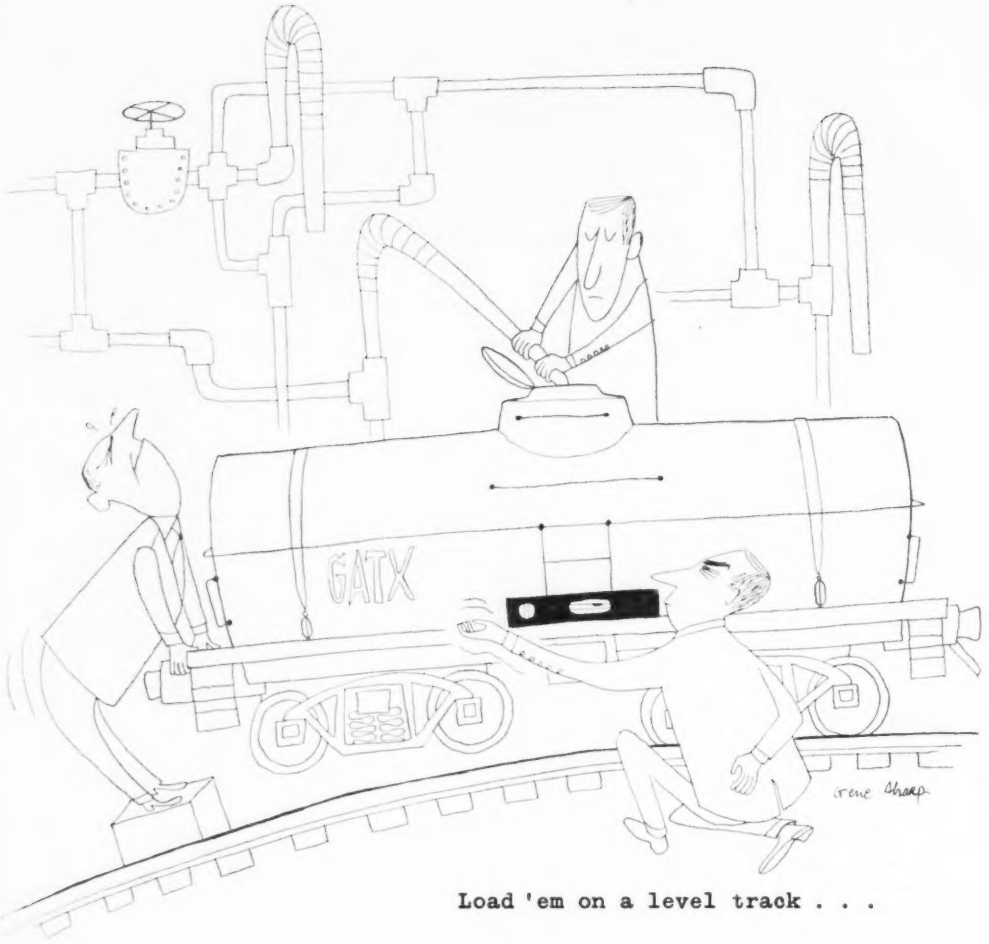
THE CARE AND NURSING OF TANK CARS



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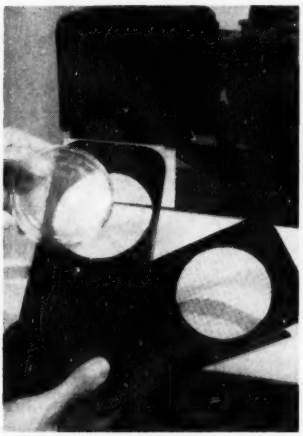
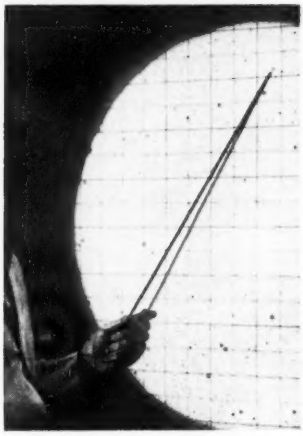
PRACTICAL IDEAS



Dish goes in holder . . .

holder into projector . . .



then tallying is easy

Projection Method Speeds Bacteria Counts

When the usual grid-and-lens system proves to be inadequate for the counting of bacteria colonies—such as those that are small, numerous, or semi-transparent—the image-projection technic will solve the difficulty.

The projection colony-counter described here is simple and requires only the adaptation of a standard 3¼x4 in. lantern-slide projector. Some of these projectors use a 500w. lamp or larger, but for the colony-counter, a 250w. lamp should be substituted to reduce the heat effect.

A piece of heat-absorbing glass, ¼-in. thick, should be placed between the lamp and condenser lenses. Object is to minimize formation of moisture on the cover of the petri dish—for such moisture makes counting difficult. A small fan directed onto the projector housing is also effective in cutting down the heat.

A holder is made of a piece of wood ⅞-in. thick and of the same width as the lantern-slide carrier, with a circular opening in one end to accommodate a standard 90 mm. petri dish with the cover on it. The wood is slotted at one end to permit clamping the dish firmly in place.

Another piece of tempered pressed wood, ⅛-in. thick and of the same size as the one described, is provided with a circular aperture over which is cemented a suitable grid made photographically on a contrast film. The grid must have fine black lines on a clear field.

The wooden dish holder and the grid holder are held together with a small screw or bolt at the other end. Thus they can be fanned apart (see first photo) for inserting the petri dish.

The culture dish—with cover on—is inserted into the holder with the agar-culture side close to the counting grid. The unit is then inserted into the channel normally used by the lanternslide carrier (center photo).

Bottom of the petri dish, containing the agar culture, faces away from the projector lamp. The beam can then be focused onto any white surface at a convenient distance, depending on the size of imagine desired (right photo). Ratio of magnification of the grid used will, of course, be comparable to the area of the culture dish, regardless of the size of the projected image.

Counting bacteria colonies by projection onto a reflecting surface is a simple method to use. It is also to be noted that the image can be viewed from behind a translucent screen. Moreover, by using an objective lens of about 10-in. focal length and placing the projector on the floor with a mirror in the beam at an angle of 45 deg., the image can be projected up through a translucent screen mounted in a table top.

As stated earlier, the cover is not removed from the petri dish. This makes counting possible during stages of incuba-

$50 EXTRA FOR BEST ITEM

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $50.

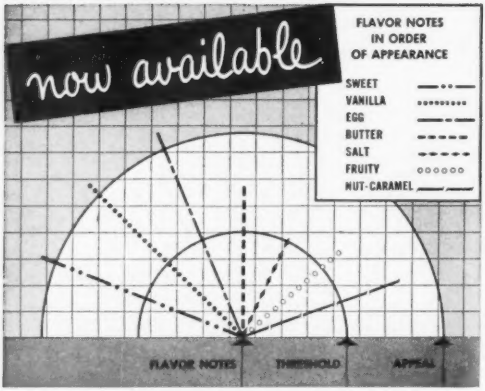
Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device on method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD INDUSTRIES, 330 W. 42nd St., New York 18, N. Y.

DECEMBER PRACTICAL IDEA voted best was "Simple Float Controls Liquid Flow," submitted by Ivan C. Miller. Described is plant-made valve that has proved dependable on a syrup line at Taylor Reed Co., Glenbrook, Conn.



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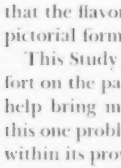

FREE copies of this Organoleptic Profile report on vanilla flavoring available to all in the Food Industry interested in more scientific methods of ingredient evaluation.

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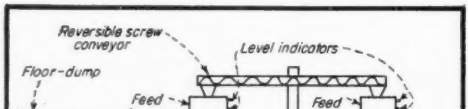
tion without the possibility of contamination of the plates, and it reduces the hazard involved in counting highly virulent organisms when these are cultured in standard petri dishes.

There is no significant parallax between the colonies and the grid. The image is viewed binocularly, which tends to reduce eyestrain. Also, certain small semi-transparent colonies that are normally very difficult to see are made visible by refraction of the beam of projected light.—*Thomas Knowles, Lighting Research, General Electric Co., Nela Park, Cleveland.*

Cleaning Rinse for Filled Cans

Excess milk and lactic acid is rinsed off full milk cans, prior to storing them in the refrigerator room, by a simply installed, water sprinkling system in the Albany Dairy Farms plant, Albany, N. Y.

As the cans travel along the conveyor from the filling room to the storage area, they pass through a narrow cutaway section in the wall. Over this opening has been placed a pipe line that is connected to the plant water lines. As the cans pass beneath, they are subjected to steady streams of water, thus are thoroughly cleaned of any excess milk.—*Phil Lance, 2015 N. 8th St., Philadelphia 22.*



Conveyor System Simplifies the Job

Sugar handlings were minimized in a confectionery plant through the use of a totally enclosed conveyor system similar to the one shown in the above drawing.

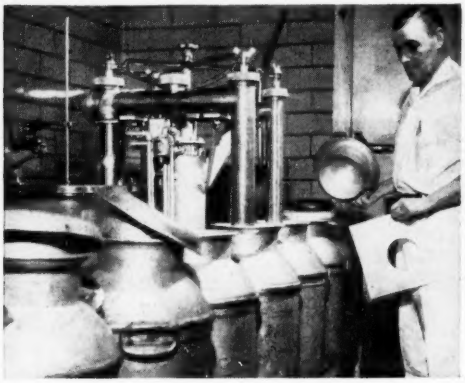
In operation, sugar is first emptied from bags into a floor-dump above a storage tank. From the latter, a

horizontal screw conveyor carries the sugar to a vertical bucket elevator that in turn raises the sugar and discharges it into the mid-point of an overhead, reversible screw conveyor.

This unit delivers sugar to either one of two feed hoppers. From the hoppers, sugar is dropped through chutes to scales and on into candy kettles directly beneath.

Filling of the feed hoppers is automatic. Each hopper is equipped with bin level indicators, high and low, which control the movement of the overhead screw conveyor driven by a reversible motor.

When the sugar in either one of the hoppers drops to the low-level mark, an automatic device starts the screw to deliver sugar to this hopper. Then, when the hopper becomes full the top-level detector control stops the conveyor motor.



Fills Cans Automatically, Doubles Output

Hard manual labor has been eliminated, production approximately doubled, and sanitation improved in the filling of 40-qt. milk cans in the plant of the Dairymen's League Co-operative Assn., New York City.

These improvements were achieved through use of a mechanical filler recently developed by company employees. The new unit can fill about 300 40-qt. and about 500 20-qt. milk cans per hour.

Formerly, this filling was a manual task. A hand-operator could keep up with the machine for a short run, but after the first hour he would tire and production would fall off rapidly.

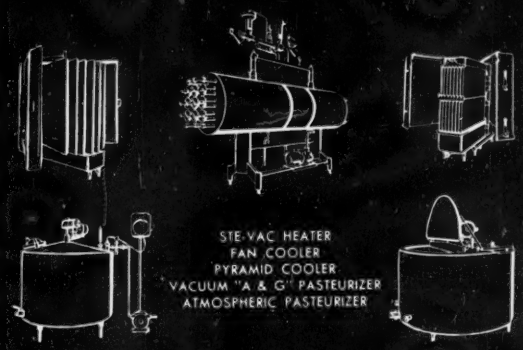
Use of the mechanical filler minimizes human contact with the milk equipment proper, thereby improving sanitary conditions.

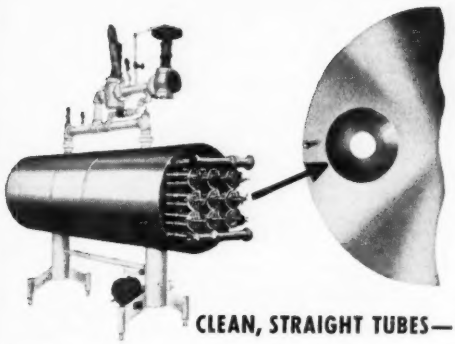
The filling device employs the siphon principle and operates in two stages, using a primary and secondary filling leg. Entire unit is constructed of stainless steel. The supply tank has two compartments, one for each filling cylinder. Liquid level in the supply tank governs the amount of milk siphoned into the can.

Initially, the siphon is primed—filled with milk through a covered opening in the top. The larger cylinder (foreground in picture), is the first filler. Regulation of this leg is not too precise, care merely be taken to see that milk does not overflow from the can being filled. Usual fill with this leg is about 38-qt. on a 40-qt. can.

Second siphon cylinder is narrower and does not extend as deep into the can as the first. Milk level in the second compartment of the supply tank, into which this siphon is lowered, is carefully regulated to obtain uniformity in final filling.

Milk levels in both compartments of the supply tank





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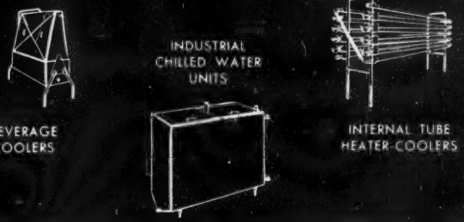

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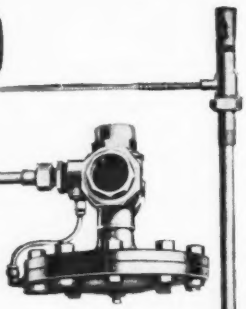

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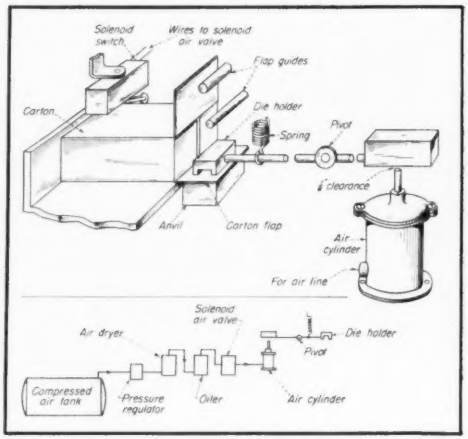
are controlled by floats. In the first compartment, the float is hooked up electrically to a solenoid controlling the air operated valve on the milk supply line. Second float is mechanical, directly operating the air valve which in turn controls the milk supply line valve. Air pressure here is 22 psi.

The conveyor that feeds cans to the filler is also operated by air, at 80 psi. pressure. And this same air line serves to raise and lower the siphon assembly.

Conveyor and syphon cylinder operation are coordinated. When siphon cylinders go up, conveyor pushes can forward the required distance.—*Harold Orr and Milton Kinney, Dairymen's League Co-operative Assn., Inc., New York City.*



Codes Inner Flap of Carton

Marking the inside of one flap of a carton is a dependable method of coding. The coding is not visible when the carton is sealed, but is readily accessible when the flaps are open.

The mechanism for this type coding is not complicated—uses merely a male die—and it functions precisely when properly set.

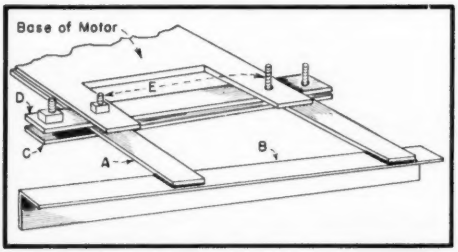
The die holder is on a pivoted rod operated by an air plunger (see top sketch above). By the use of properly aligned guides, one flap of the carton is brought over an anvil and under the die holder. A strong spring, attached to the pivoted rod, keeps the die holder raised at least an ⅛-in. at all times, except at the instant when the blow is struck to impress the code.

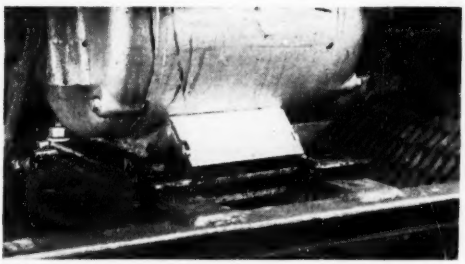
The hammer is energized by a small air cylinder. Air is supplied at the proper time by means of a small electrically operated air valve. A roller type micro switch energizes the air valve. The impulse from the air-cylinder plunger drives the die against the flap, impressing the code, and the spring retracts the die holder before it can interfere with the movement of the carton.

One precaution is necessary for efficient operation of this system: There must be a ⅛-in. clearance between the end of the travel of the air plunger and its contact on the pivoted rod. This permits instant clearance between the flap and the die after the impression is made.

Sequence of attachments in the air line for effective air cylinder operation is illustrated (lower sketch). The pressure regulator controls the depth of the impression of the code in the flap. The air dryer is an asset in preventing moisture from entering the solenoid air valve, which quickly

rusts if no dryer is used. The oiler carriers over only enough oil to keep the air valve and cylinder lubricated.—*Conrad Frelor, Philadelphia.*





Motor Base Easy to Make, Inexpensive

That motor base you need can be readily, and inexpensively, fabricated. And it will prove advantageous for quickly effecting power-transmission belt alignment or take-up.

Referring to diagram, two metal anchor straps (A) are welded to frame or cross members (B) where the motor is to be located. The outside edges of the bars are flush with the width of the base of the motor. Four lengths of 1 to 1½ in. straps of iron (C) and (D) are then cut, 2 in. longer than the outside width of the anchor straps.

Bolt holes are drilled near the ends of these straps which are bolted together in pairs above and below the anchor straps. Bolts are welded to the top straps (D) in line with the bolt holes in the motor legs or base.

To assemble, place bolts welded to straps (D) through bolt holes in motor base and tighten nuts. Rest straps (D) on anchor straps (A), place straps (C) underneath anchor straps and bolt to straps (D). Motor adjustment is quickly made by loosening nuts on bolts between straps (C) and (D). Motors are changed by removing nuts on bolts (E).

Hand Spray Used to Apply Oil

Through use of a small hand spray and penetrating oil we were able to free and remove a hard-to-get-at gear.

The inconveniently located gear was frozen to the shaft. By employing the hand spray we applied a fine film of penetrating oil all around the front and back of the shaft and gear. After a short time the oil had worked itself in and we were able to free and remove the gear.

Since then we have found other lubricating uses for the hand sprayer. We now use it for applying light rust-proof oil on hand saws, steel polishing wheels, and other tools. This way, these jobs can be done without messiness or getting the hands dirty.—*Howard Miller, 950 Laguna Ave., Burlingame, Calif.*

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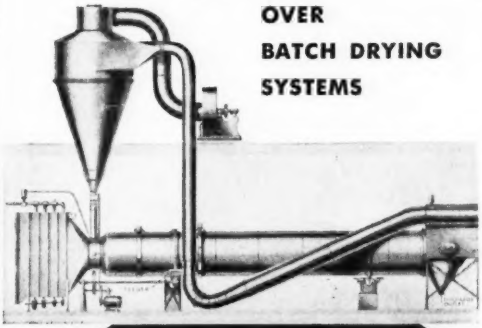
OVER BATCH DRYING SYSTEMS



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FACTS ON FILTERING

Representative case histories on widely varied clarification problems condensed from field reports of Johns-Manville Filtration Engineers

Hyflo Makes Apple Pressing Easier

(reported by J-M Eng. F. D. Richards)

CINCINNATI DISTRICT: During my first call on this customer, I recommended the use of 2% Hyflo Super-Cel as a pressing aid in their apple pulper.

Recently, when I called again, they informed me of their results. Ordinarily, with the kind of apple they are using at present, the press cake is squashy and slippery. With Hyflo, the cake is much firmer and they are able to operate the press at a higher pressure. This, according to their estimate, has increased the juice yield by approximately 5%.

Although with other types of apples, no increase in yield has been noted, the addition of Hyflo does permit easier stripping of the cake, and this advantage alone is sufficient to justify its use.

$3 Bag of Super-Cel Returns $57.40 Profit!

(reported by J-M Engineer H. G. Martin)

Recently, one of my customers phoned, asking if we could increase their grape pressing yield in gallons of juice and in time saved. If so, they wanted me to show them how to do it.

They place 192 lbs. of Concord grapes in a steam-jacketed cooker, stems and all, with about 1 gal. of water. Steam is applied, and after cooking, the free juice is drained from the bottom.

Before the juice was drained, I added one pound of Hyflo Super-Cel (about ½% by weight of grapes) and stirred it throughout the mass. After a thorough stirring, the mixture was placed in cheese racks under the hydraulic press.

Previously, without Hyflo, the pressing operation had taken 16 minutes. With Hyflo, the press closed completely, producing a dry cake in nine minutes. Instead of requiring a total pressure of 1100 lbs. psi, the press was finished at 600 lbs. psi. There was no slippage of the frames, the cloths cleaned better, and there was no breakage of cloths. In addition to this, the final yield of juice was so much greater that each $3.00 bag of Hyflo used resulted in an overall profit of $57.40.

Needless to say, the use of Hyflo will not stop with the grape presses, but will be standard for all their fruit jelly juices.

Sales Appeal Improved with Celite 545

(reported by J-M Eng. W. A. Reschke)

CHICAGO DISTRICT: A trial run convinced this customer that he had much to gain and nothing to lose by using Celite as a pressing aid in making jelly from frozen grapes.

The equipment used was a vertical hydraulic press. Previously, without Celite, the centrifuges had to be cleaned 3 times a day. With Celite, they required cleaning only once a day. Customer also noted that the cloths were in better condition after pressing with Celite. Production of juice remained about the same, but the jelly was much clearer—it had better sales appeal—and judging from its appearance, a much longer storage life could be expected.

These advantages were obtained by the addition of 20 pounds of Celite 545 to each 900-lb. batch of grapes pressed.

Gets Premium Price for Strawberry Juice Filtered with Celite 545

(reported by J-M Eng. Scott Robbins)

A few months ago, one of my customers purchased a 26 sq. ft. filter to be used in reclaiming syrup used in the treatment of maraschino cherries.

At the particular time the filter arrived, strawberries were in season, and they put it in operation on strawberry juice using Celite 545. The new filter did an excellent job, and they were able to get a premium for this juice from the jelly manufacturer.

In fact, customer was so pleased with the results obtained that they are planning to extend the use of Celite to many of their other operations.

Let Your J-M Engineer Help You With Your Filter Problem

Johns-Manville Filtration Engineers can usually help you solve a filtration problem right on the job, often by suggesting a few simple changes. They may find that a slight change in equipment, operating technique, method of adding filter aid—or a change to another type of filter aid will increase production without affecting filtrate quality. If you are having trouble getting clarity or if your filter station is a "bottleneck," get in touch with your local Johns-Manville representative, or write to Johns-Manville, Box 290, New York 16, N. Y.

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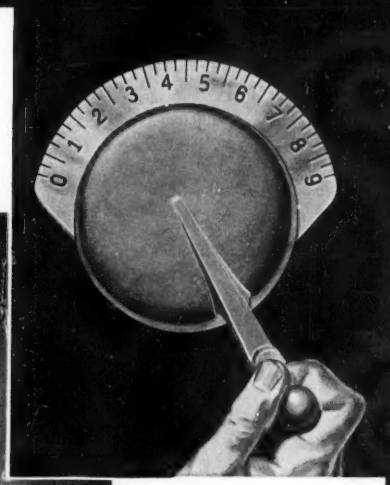

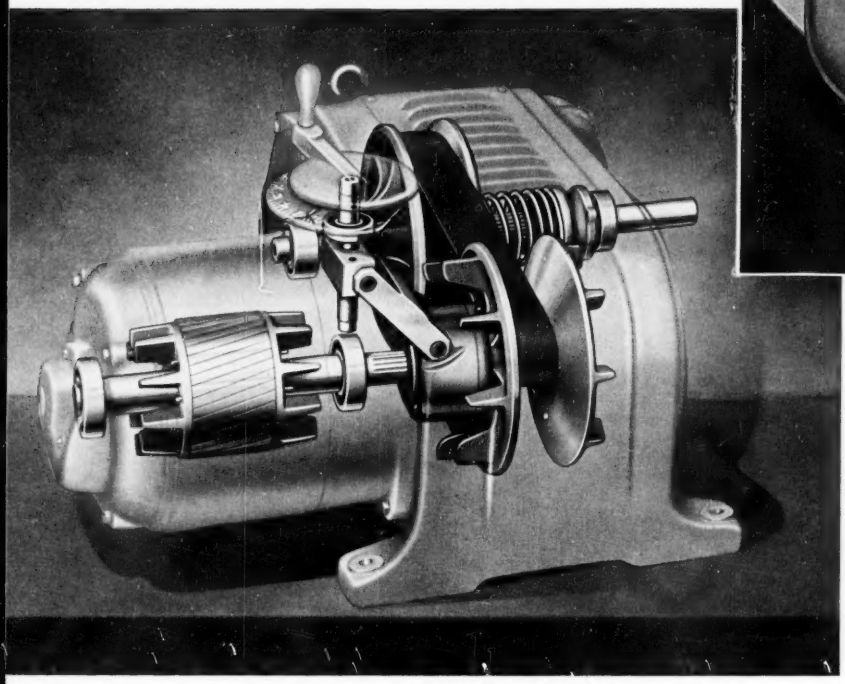

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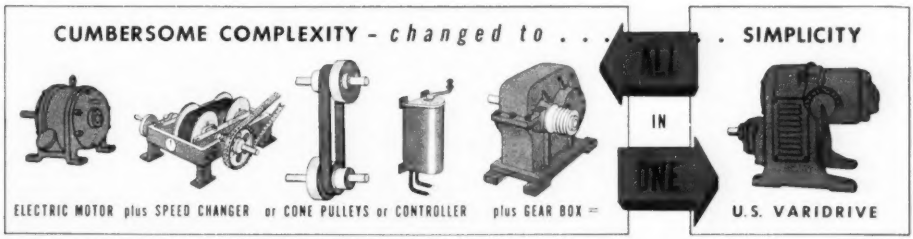
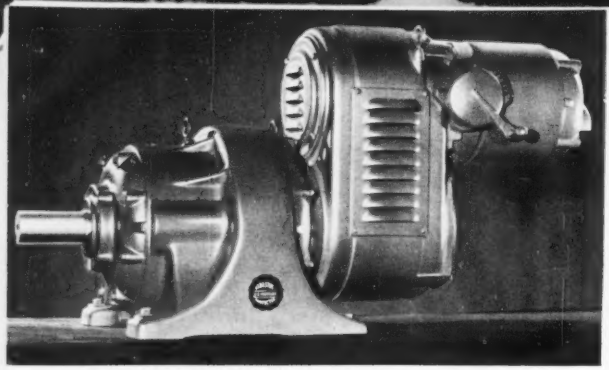


. . . a tip to the very wise—buy Varidrives

(See next page)

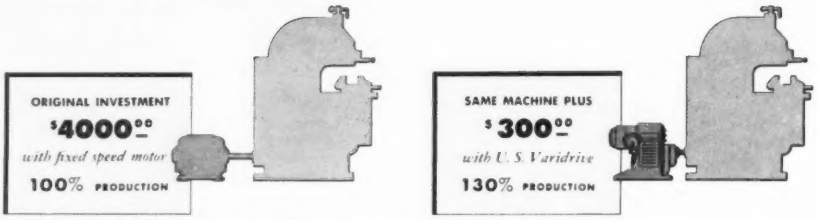


Type VEV-GD, U. S. Varidrive-Syncrogear

U.S. VARIDRIVE

COSTS ONLY FRACTION OF DRIVEN MACHINE

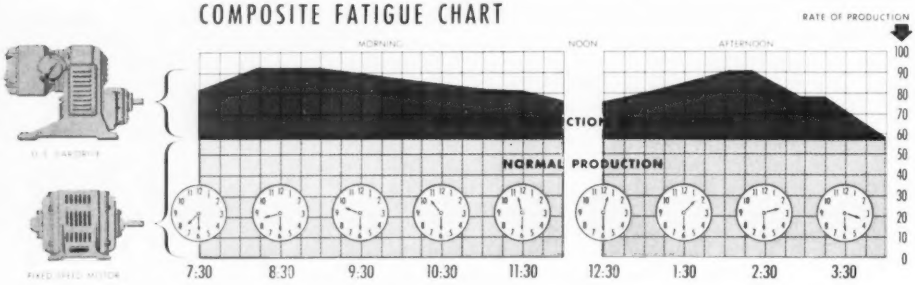
INCREASES OUTPUT 10% - 20% - 30% OR MORE



MAKING YOUR MACHINES GIVE BONUS PRODUCTION

Many machines do not operate at top efficiency simply because the proper speeds are not available. A Varidrive in place of a constant speed motor provides an infinite number of speeds for instant selection. The cost of a Varidrive is usually a small fraction of the total investment in machinery, factory space and overhead. These same facilities can and will provide a *bonus* in production or quality of product if given the opportunity to operate at top efficiency under all conditions. A cost study of countless Varidrive installations reveals that the added investment averages about 10 per cent of the value of the driven machine, but the increase in production capacity runs up to 30 per cent, even higher in many instances. You gain a flexibility of control in your machine which no fixed speed motor can give. Therefore, Varidrive gives your operator both the incentive and means of turning out better work and stepping up his production. You get the *most* out of your machine.

COMPOSITE FATIGUE CHART



Varidrive keeps in step with operator needs

Human ability varies greatly. Fatigue is an important element which causes variation throughout the working day. A production process must never exceed a worker's ability or the result may be spoiled work or accidents. A fixed motor speed must, therefore, be chosen for the minimum ability for the day. The chart above is an example of the variation compiled from records of many workers. It is obvious that for maximum efficiency the rate of production should be adjusted to the needs of the operator. The Varidrive's speed can be synchronized to the operator's rhythm of action, thereby helping him attain maximum daily output without over-exertion.

For the complete Varidrive story, ask for Bulletin 1515

U.S. ELECTRICAL MOTORS Inc.

PACIFIC PLANT: Los Angeles 54, California **ATLANTIC PLANT: Milford, Connecticut**

Atlanta 3, Ga.; Bakersfield, Calif.; Boston 16, Mass.; Chicago 8, Ill.; Cincinnati 16, Ohio; Cleveland 14, Ohio; Dallas 9, Texas; Detroit 2, Mich.; Fresno 1, Calif.; Houston 4, Texas; Indianapolis 4, Ind.; Milwaukee 2, Wisc.; Minneapolis 2, Minn.; New York City 6, N. Y.; Philadelphia 2, Pa.; Pittsburgh 2, Pa.; San Francisco 7, Calif.; Seattle 4, Wash. » » » » *Distributors and Agents in all principal cities.*

HOW TO GET

Correct fluid agitation

IN ANY VESSEL

1 Study the pictures at right. Notice how the mixing action improves when the mixer is adjusted to the correct angle.

2 Standardize on LIGHTNIN Mixers. There is a Lightnin Mixer for every food mixing job involving fluids.

Lightnin Portable Mixers swing to any desired mixing position instantly, and lock in place with a turn of the handwheel.

GEAR DRIVE PORTABLE MIXER for viscosities of 500 to 4,000 centipoises. Sizes, ¼ to 3 HP. *Also available:* direct drive portable mixers, variable-speed air driven mixers. More than 30 standard models for every food mixing application.

Other Lightnin advantages are:

Ball bearing motors, prelubricated and permanently sealed.

Extra outboard bearing on mixer shaft to take the load off the motor bearings. This adds years of life to the mixer.

Easy shaft adjustment with thread and taper tube and chuck. No loosening, no jamming.

Under ordinary conditions, Lightnin Mixers run day in and day out, year after year, with lubrication only once a year. Every Lightnin Mixer is *guaranteed* to do the job!

Send today for Catalog B-75 and other helpful literature.

WHEN THE SHAFT is on the centerline of the tank, forces are balanced and a swirl or vortex is created. Desirable for drawing down light powders but inefficient for general mixing.

PUTTING THE SHAFT in this quadrant creates a long swirl without vortex, and with very little top-to-bottom turnover.*

THIS IS THE recommended position. Note heavy top-to-bottom turnover, with the material folding over and blending intimately.*

*Unit illustrated rotates *counterclockwise,* as viewed from above and behind motor. When mixer rotates *clockwise,* the correct position is opposite to that shown.

Lightnin® Mixers

MIXCO® *Engineered*

Complete Mixing Service for the Food Industries

FOR CLOSED TANKS—Lightnin propeller type top entering agitators from ¼ to 3 HP. Send for Catalog B-78.

FOR HEAVY DUTY MIXING—Lightnin top entering agitators, turbine or paddle type. Sixteen interchangeable speeds in new heavy duty drive. Sizes, 1 to 200 HP. Send for Catalog B-36.

MIXING EQUIPMENT CO., Inc.

(MIXCO)

143 Mt. Read Blvd., Rochester 11, N. Y.

In Canada: William and J. G. Greey, Ltd., Toronto

Please send me the literature checked:

- ☐ B-75 Portable Mixers (Electric and Air Driven)
- ☐ B-78 Top Entering Mixers (Propeller Type)
- ☐ B-36 Condensed Catalog showing complete line
- ☐ Mixing Operations Data Sheet

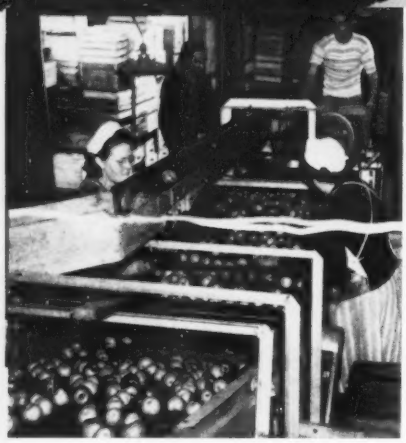
Name _____ Title _____

Company _____

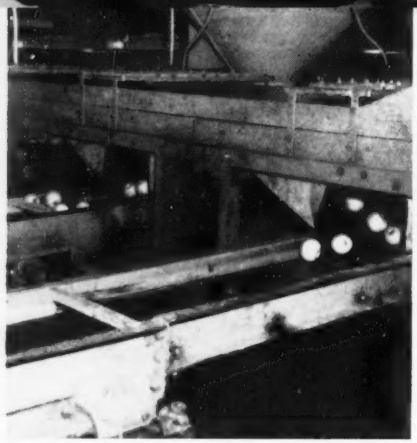
Address _____

City _____ Zone _____ State _____

TURN PAGE FOR FOLDOUT FLOWSHEET →



1 **INCOMING** apples are inspected and screened into small and large sizes.

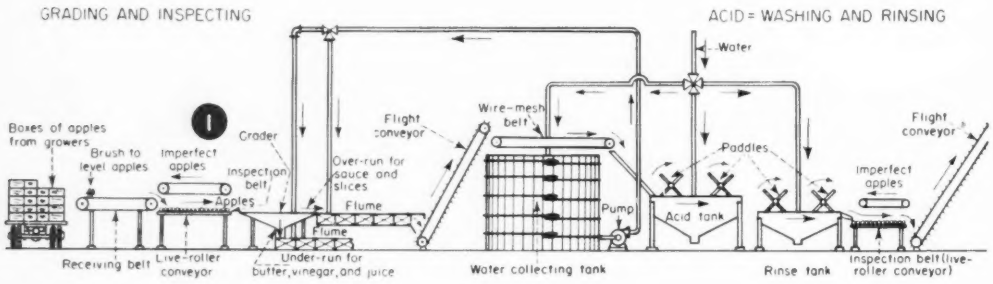


2 **ACID-WASHED** and rinsed apples go to this grader that screens them into four sizes.

UNFOLD HERE

Mechanized Apple-Slice and Sauce Lines

Automatic units grade, peel, slice or pulp, cook, and fill fruit into containers



OPERATIONS on the apple slice and the sauce lines at Knouse Foods Cooperative, Inc., Peach Glen, Pa., combine the most advanced processing techniques with the newest equipment. The set-up is for straightline production.

How processing is carried out on both these continuous lines is detailed in the foldout flowsheet (above and right).

First step on both lines is grading—depicted at Point 1. Here, on live-roller conveyors, imperfect apples are separated from incoming fruit, which is then screened into small and large sizes. Small apples go into butter, vinegar, or juice concentrates. Large ones are used for sauce or slices.

Next comes washing—a two-step operation. First, the large apples travel through an acid-wash tank, in which spray-residues are removed from them. Then the apples go to a rinse-tank, where acid is washed off the fruit.

Peeling and trimming follow (Points 3 and 4). Belts carry the apples to peeling lines, where girls feed them to triple-headed paring machines. Peeled apples then drop onto a conveyor that takes them to girls who trim them.

Slices are processed in this manner: Peeled apples are fed to a slicer that cuts them into 1-in. segments. Slices are then flumed to a shaker screen, where small pieces are separated from uniform segments. Latter go to inspection.

Deaeration is the succeeding step. Here, slices are chuted into a cooker and steam-blanched under vacuum.

Canning is next. Slices are automatically filled into cans with syrup. Cans then pass under a series of hot water sprays and a compression belt that presses slices in cans.

After cans are machine-sealed, they go to Anderson-Barngrover continuous cookers and coolers—the final steps.

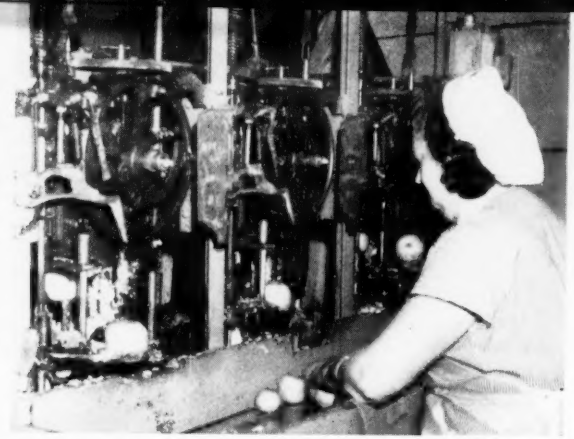
Now for the sauce operation: Following inspection and trimming, apples go to a chopper that cuts them into $\frac{1}{8}$-in. slices, which are screened in a rotary separator.

Final steps are cooking and packing. Screw conveyors feed sugar and slices into a continuous cooker, where the sauce is heated to 230 deg. F. for $2\frac{1}{2}$ min. (Point 10). Sauce then goes to pulper and filling lines.

Now in preparation is an additional flowsheet detailing the manufacture of apple juice, jelly, butter, vinegar, and dried pomace. Look for it in an early issue of FI.

How It Was Done

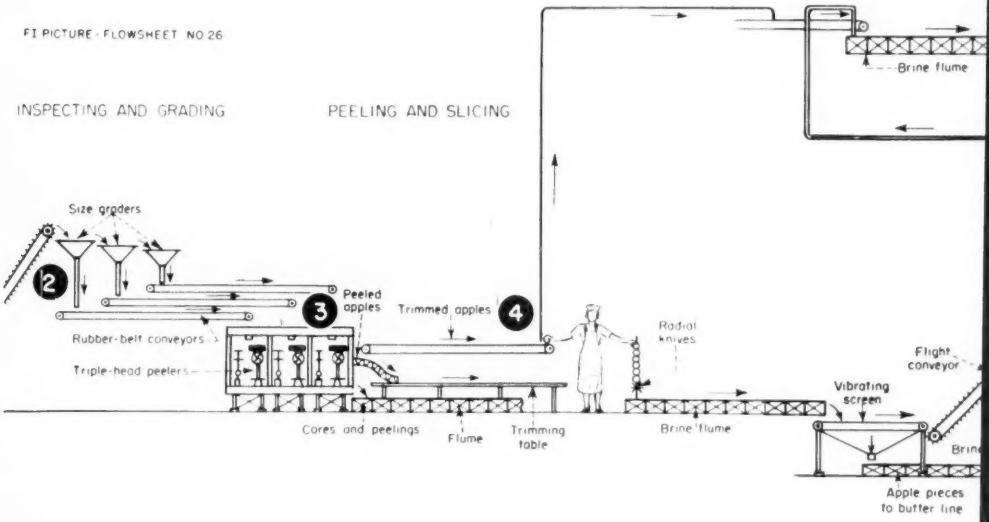
Complete story of the development of Knouse's superlative apple operation—the building of a seven-product quality line that has won national repute within only two short years—is recounted in this month's special article, "Makes Big Strides in Apple Processing." **Turn to page 111.**



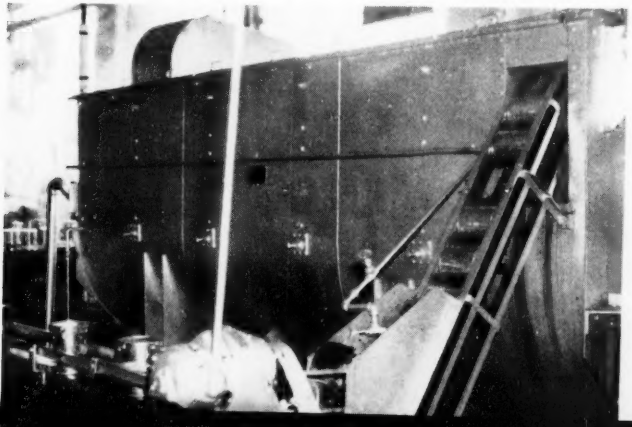
3 **OPERATOR** feeds apples to peeling spindle of triple-head paring machine. Output at Peach Glen is 116,000 peeled apples per hr.

4 **FROM** battery of paring machines (rear), pee
ming belts. Then trimmed apples are fed to

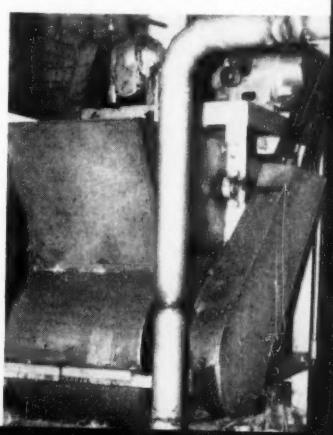
FI PICTURE - FLOWSHEET NO 26



8 **CANS** are inverted and flight-conveyed into continuous cooker and heat-processed for 15 min. in 190-deg. F. water bath. Continuous cooling is next.

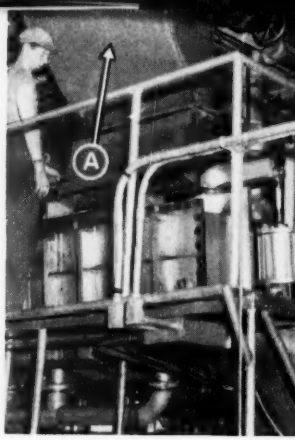


9 **ON SAUCE LINE,** peeled and t
apples go to chopper that cuts ⅛-in.

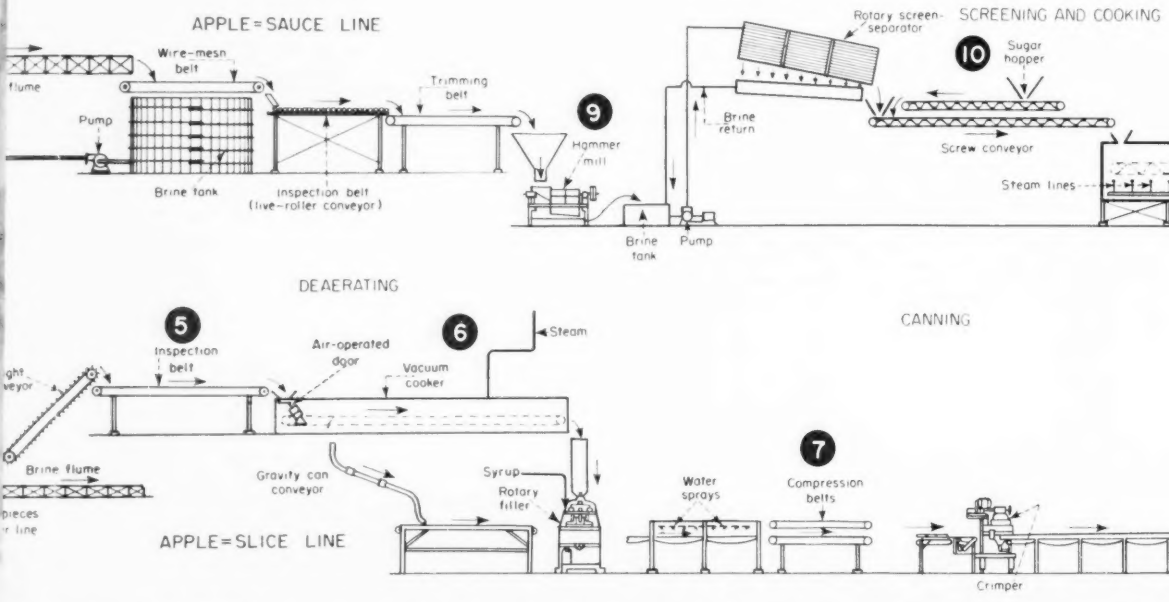


r), peeled apples go to trim-ed to slicer (A).

5 **ON INSPECTION BELT,** slices (A) not conforming to standards are flumed to cider-press room. Uniform slices (B) go to cookers.



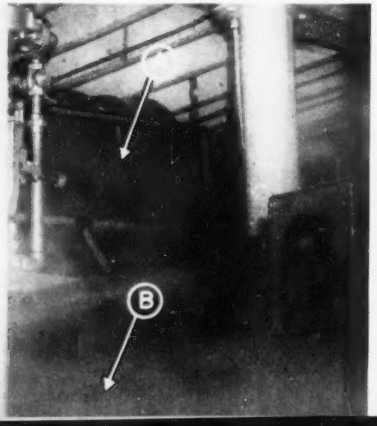
6 **HOPPER** (A) feeds 750-lb. batche are then steam-blanched under v

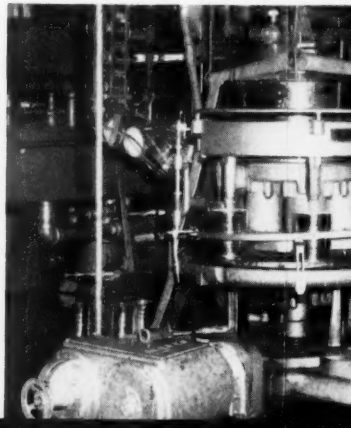


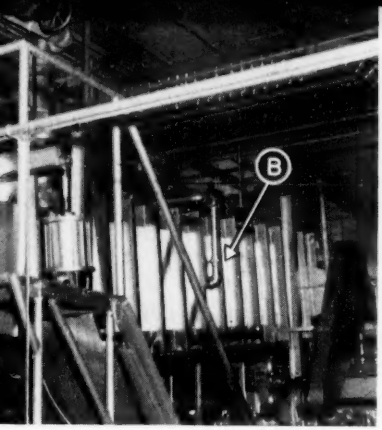
and trimmed ¾-in. slices.

10 **SLICES** fall into brine tank, from which they are pumped into rotary screen separator (A). Then, sugar and slices go to cooker (B).

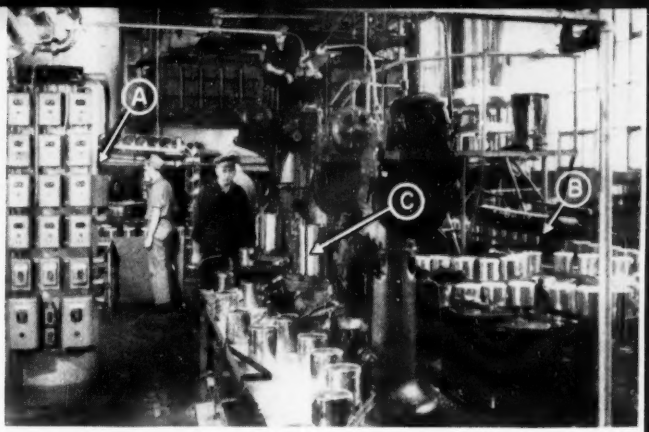
11 **SAUCE** is machine-filled (center) int sealed (right). Product is also put up



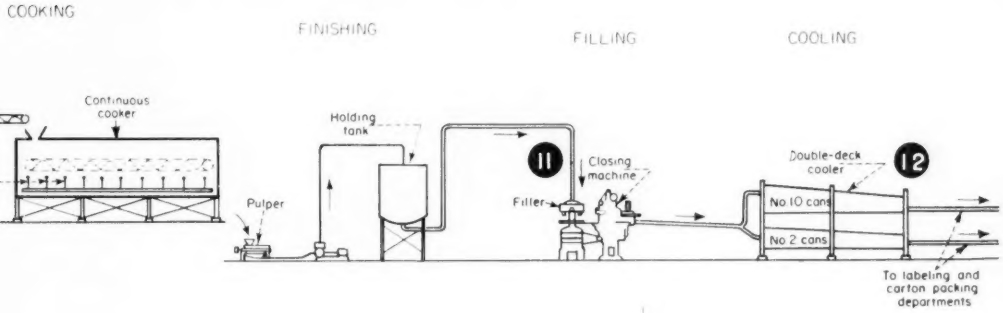


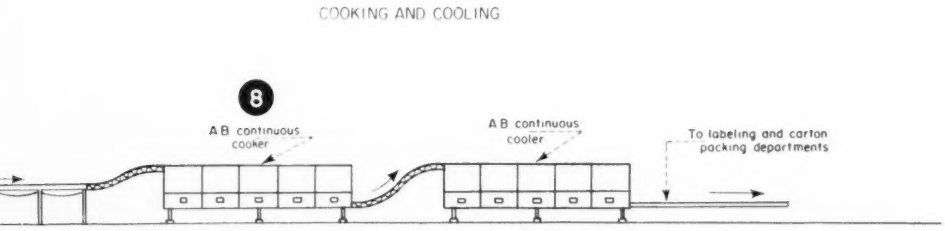


0-lb. batches of slices into cooker (B). Slices
ed under vacuum in three cookers.

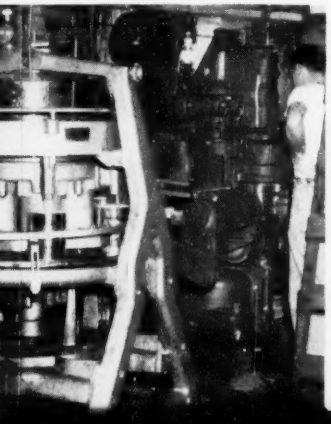


7 **BLANCHED APPLES** are filled (A) into No. 10 cans that go under compression belt (B), where slices are pressed in. Cans are sealed (C).

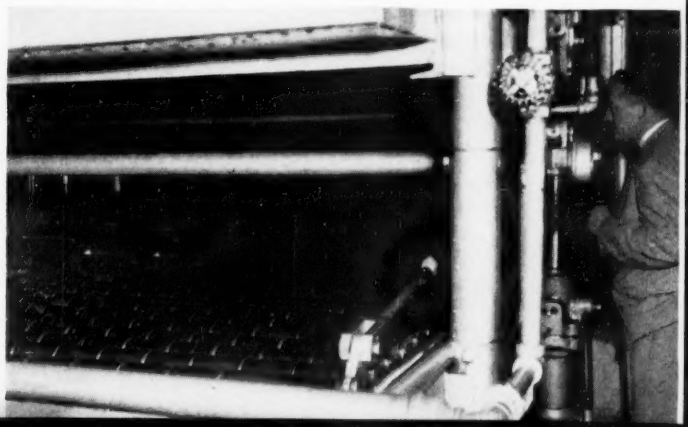




center) into No. 10 cans. Then tins are
lso put up in No. 2 cans and glass jars.

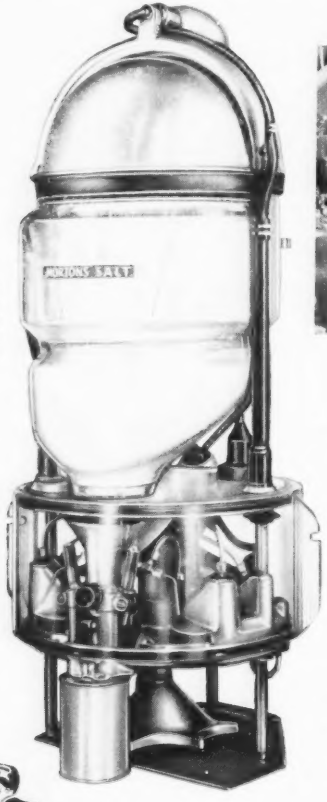


12 **CANNED SAUCE** is continuously cooled in this double-deck unit. Glass-packed sauce is cooled on slotted conveyor, equipped with water sprays.



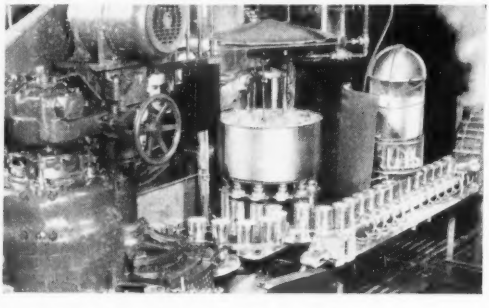
Bulk Salting Simplified

Leading canners have enthusiastically adopted the Morton simplified bulk salting method. Plant and laboratory tests have proved that the Salter Unit dispensing Morton's Vacuum Refined Canners Salt is the answer to simplified bulk salting on today's high speed lines. With broad experience in all phases of canning technology and processing, the Morton Canning Specialist is well equipped to help solve your salting problems. Send for Bulletin 304 fully describing the Salter Unit, and ask for a Morton Canning Specialist.



Close-up of Salter Machine in Comparison with No. 2 can

Salter Unit on production line of large canning plant



- **Salting costs substantially reduced.**
- **Eliminates skilled hand labor.**
- **Makes possible bulk buying economy.**
- **Assures uniform salting control.**
- **Unit dispenses mixtures of Morton's Vacuum Refined Canners Salt and calcium sulphate, M.S.G., sugar and other curing agents.**
- **Dispenses calcium chloride and pickle spices separately.**
- **Fills either tin or glass—compact unit clamps perfectly on any production line.**
- **Metering to any quantity desired.**
- **Automatically coordinates with line speeds.**
- **Salter units installed on lease rental plan.**

Consult now with a Morton Canning Specialist

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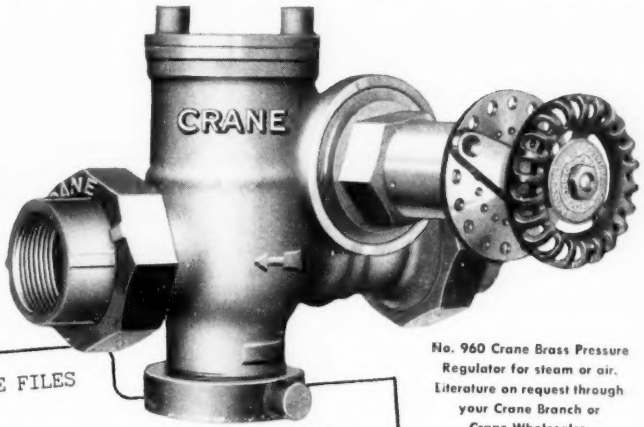
make it yours
ith dependable quality

CRANE VALVES



No. 960 Crane Brass Pressure Regulator for steam or air. Literature on request through your Crane Branch or Crane Wholesaler.

A CASE HISTORY FROM CRANE FILES

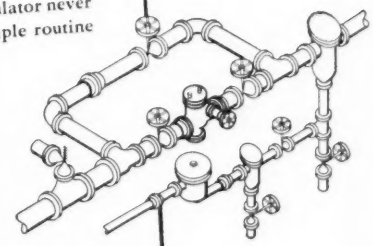
PROBLEM: To choose a pressure regulator that would assure a steady, unvarying steam supply to cooking kettle for an exacting brewing process.

WORKING CONDITIONS: Regulator subject to continuous operation 24 hours per day. Main steam supply at 100 psi to be constantly reduced and maintained at 30 psi.

SOLUTION: Crane No. 960 Brass Pressure Regulator. (*Former model with integral non-renewable cylinder.*)

RESULT: For 16 years, throughout its lifetime, the Crane 960 Regulator never failed, never faltered, never required more than prescribed simple routine servicing.

Replaced with new Model 960 Crane Pressure Regulator. With all wearing parts renewable, it will virtually never wear out. Now in service 18 months; operating cost: zero.



A typical example of the long life and low-cost maintenance that make Crane Quality the best value in all types of valves. That's why...
More CRANE VALVES are used than any other make

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Why endure this needless cost? Floors of Mosaic Carlyle Quarry (Real Clay) Tile shrink maintenance costs as much as 50%, according to building managers.

Figure it for yourself. Mosaic Ceramic Tile floors resist stain, heel marks—clean with a minimum of time and effort—never need costly refinishing or treating—*don't need replacement.*

And, where food is processed or handled, *sanitation* is assured. Fats, greases, organic acids and other spillage do not penetrate the surface—can be easily maintained with mop, cloth or hose.

Unlike most floor materials, Mosaic Carlyle Quarry Tile is at home in cold storage rooms; as exterior walkways and store fronts; on commercial kitchen and cafeteria floors, and in countless other areas where beauty, economy and rugged durability are essential.

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THE MOSAIC TILE COMPANY

(Member—Tile Council of America)

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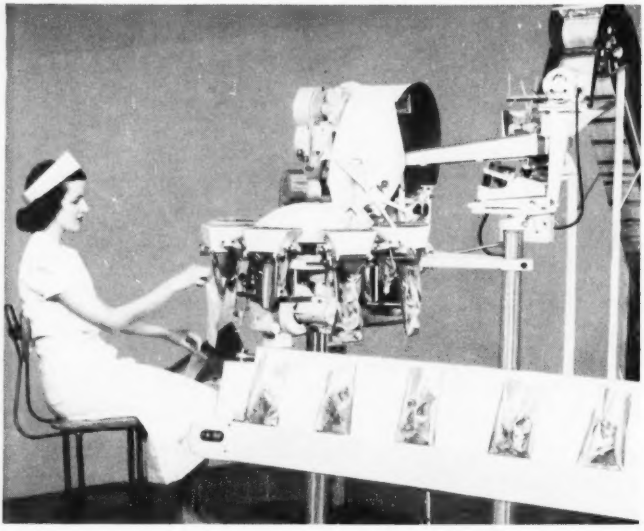
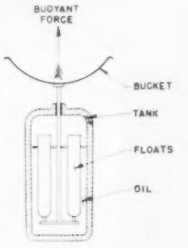
TRADE MARK REG. U. S. PAT. OFFICE

Net weighs and fills many free-flowing dry products at speed of 55 packages per minute with unsurpassed accuracy.



HY-TRA-LEC was introduced in 1946. This exclusive Wright development was the first application in packaging machinery of the principle of "positive displacement" to weighing. Beam scales, springs, and dashpots were eliminated.

Since introduction, various HY-TRA-LEC models have been developed which improved performance or extended the application of this unusually sensitive and accurate method of weighing. Single and multiple units are now in operation on semi-automatic and automatic lines in more than 300 leading plants.



HY-TRA-LEC is the "brains and heart" of the Model H. The weighing bucket is mounted on a flotation unit which is free to move up and down within limits. The special fluid, which retains its viscosity despite variations in temperature, exerts an upward force on the floats and therefore on the weighing bucket. This upward buoyant force is pre-set to correspond with the desired net weight of product to be weighed.

The outstanding feature of this method of weighing is the promptness with which the flotation system responds to a unit change in weight. This is called "sensitivity". HY-TRA-LEC does not have to overcome the inertia of a mass equal to the final net weight as does the conventional beam scale. Therefore, it is more sensitive, which means that it is also more accurate.

If you are interested in accurate-high speed weighing, send us samples of your product. We will make the test free of charge. If Hy-Tra-Lec handles your product, you can save $5,000 or more per machine within 12 months.

Remember! The world's largest cracker, candy, potato chip, pretzel, cookie and food manufacturers are using this revolutionary method of weighing.

Model H is the newest in the Hy-Tra-Lec weigher line. There may be a model to fit your requirements. You have everything to gain and nothing to lose by investigating now.

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Worth looking into!

...says Archie the chef

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FIRST OF ALL—*smell the difference* . . . notice the lack of odor . . . the freshness.

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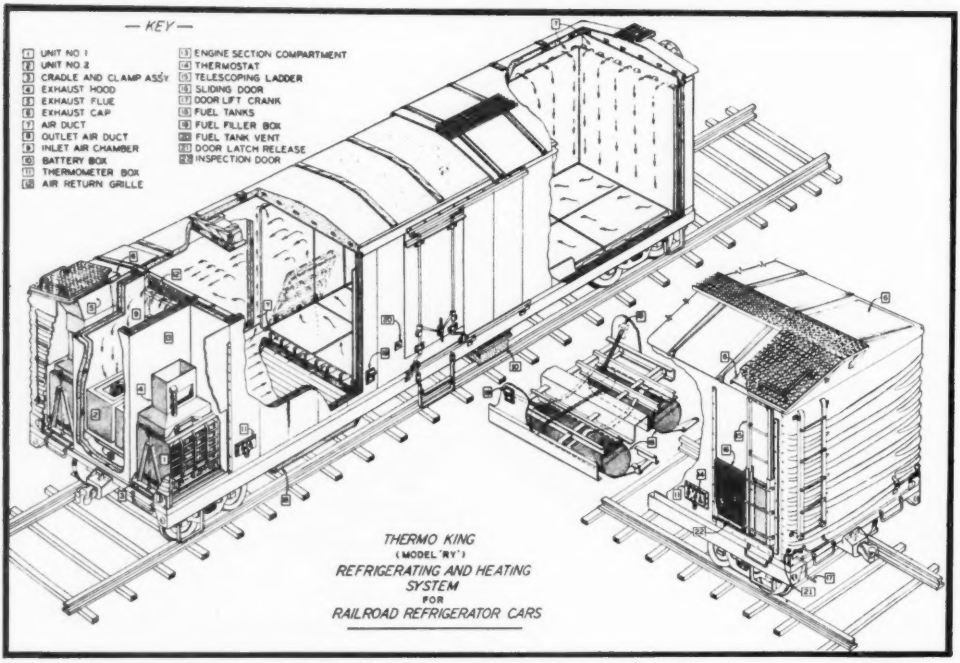


How reefer temperature and humidity are controlled by two-unit refrigeration system

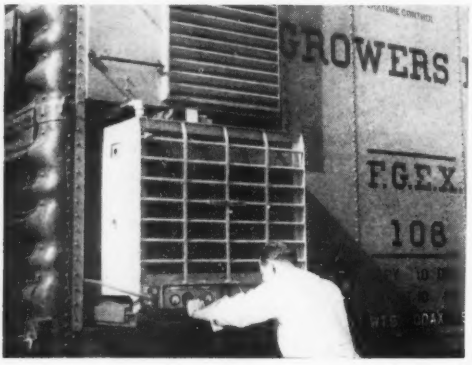
Mechanical Units Heat or Chill Car

Advantages reported for reefers equipped with a new two-unit refrigeration system are: Controlled temperatures simply by setting a dial; controlled humidities using a recently developed device; substantial savings in man-hours through elimination of icing, re-icing and de-icing; ease of maintenance; and stand-by protection.

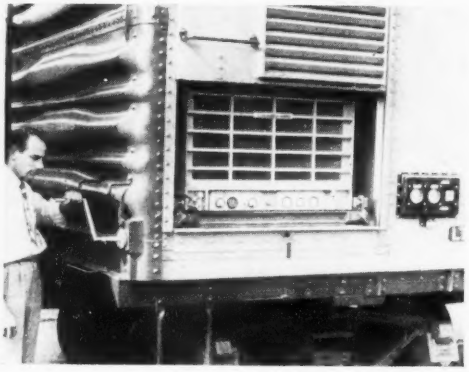
During two years of tests and several months of commercial runs, temperatures as low as —20 and as high as 80 deg. F. have been maintained inside the car during transit.

With the new humidity device, shippers of such products as lettuce and strawberries can employ mechanical refrigera-

Each unit is easily pushed in place . . .



. . . and screen readily lowered by crank



tion. It will eliminate top and body icing, and prevent body slime, mold, wilting and dehydration.

This humidity invention involves a series of dampers that seal off the cargo compartment and stop the fresh produce from "breathing." These dampers do not swing into sealing position until the moisture brought out by the preliminary cooling process has been carried away.

Once the product has attained the desired coolness, the "lid" goes on and the refrigerated air, for remainder of the haul, is confined to the cold wall that envelops the car. To prevent stratification, a small auxiliary fan circulates air within the cargo space.

The refrigerating and heating system is comprised of two completely self-contained units installed at one end of the insulated refrigerator car. For each unit there is a slide-drawer type of mounting base firmly anchored to the car. When a unit is to be installed, this base is pulled outward and the unit placed on it.

Two simple connections are made for fuel and automatic controls, then the unit is pushed into place. By turning a crank at the end of the car, the front screen is lowered into position and the exhaust chimney is lowered and clamped to the top of the unit. Chimney carries off fumes and heat from the engine section.

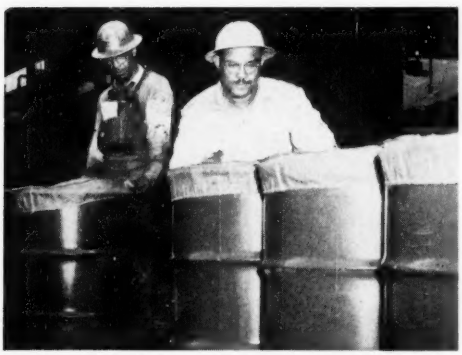
One unit is capable of refrigerating the car. Automatic controls are so devised that the second unit will begin to operate in the event the first stops.

A feature of the system is its ability to provide heat. If the outside temperature falls below the temperature being maintained in the car, the units will automatically operate on the heating cycle.

Floor and walls of the car form ducts through which the air flows. Car is provided with sidewall flues through which air from the units is forced upward. Floor boards are made up of solid plywood panels mounted on notched stringers.

A system of signal lights and thermometers is installed at both sides of the car at the end containing the equipment so that a glance at either side will tell the operating condition of both units.

Two fuel tanks, of 155 gal. each, are located on the underside of the car. This amount of fuel is more than ample for a cross country trip. Batteries are kept charged by generators in the units.—*U. S. Thermo Control Co., 44 South 12 St., Minneapolis, Minn.*



Paper Covers Guard Barrel Contents

Barrel and drum covers made of Neoprene-impregnated paper have proved to be an efficient and economical means of guarding contents against rain or unwanted particles.

Idea was developed in a chemical plant which now uses thousands of them to keep intermediate chemicals clean and dry during temporary storage or within-the-plant shipping (see item. p. 92 Nov. '50 FI).

The covers are manufactured from heavy, creped kraft containing a small percentage of Neoprene synthetic rubber. Neoprene latex is combined with paper pulp at the mill. This adds to the finished paper's wet strength and imparts resistance to sunlight, oils and chemicals.

Top of the cover is the diameter size of the barrel. A short skirt hemmed with an elastic band is stitched to it. The cover is held firmly in place by the elastic.

Economy comes from two sources: The paper covers are about one-fourth the cost of wooden barrel heads and metal lids, and require far less time in putting on and taking off.

At present, covers are being made to fit only a standard 55-gal. drum or barrel. They are single ply, 2 ft. in dia. with 4-in. skirts.—*Chase Bag Co., 309 W. Jackson Blvd., Chicago 6.*

More Than 180 Models in '51 Truck Line

Recently introduced line of 1951 trucks covering more than 180 models offers many advanced features.

All engines have automatic Power Pilot carburetion-ignition engine control. Cab and front ends have been restyled to give a smarter appearance. Rear window provides 3½ ft. of vision.

Instrument panels incorporate full vision units, rheostat-type light switches and a hand throttle in all conventional models. Weather sealing on door is reported improved.

A steering column gear shift on light duty models provides more cab and floor space. Rear axle ratios on these trucks have been changed from 3.73:1, to 3.92:1. The standard

DON'T MISS THESE . . .

Pushbutton pallet loader takes packages from conveyor line and stacks them.....Page 150
Two-pass automatic weighing system achieves superior accuracies.....Page 152
Unit melts shortening and pumps it directly from barrel into fryer.....Page 154
Small weigh-belt feeder operates continuously, has a capacity of 3 cfm.....Page 157

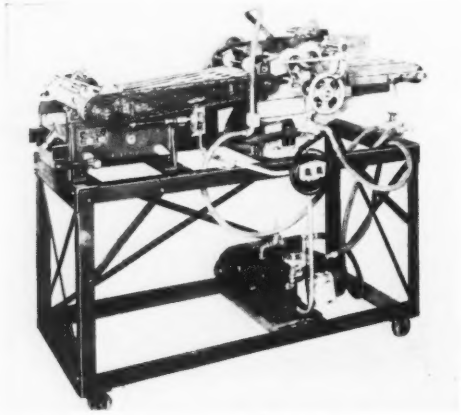
AND WATCH FOR . . .

Automatically operated fire-protection system using dry chemicals as extinguishing agent.....March FI
Small, self-contained, 7-day temperature recorder for use in refrigerated trucks, RR cars.....March FI

three-speed transmission has constant-mesh helical gears with synchronizers in second and third speeds.

Cast spoke wheels, with demountable rims which provide interchangeability with trailer wheels, are now standard on F-7 and F-8 models, but steel disk wheels are available.

A new cab, called The Five Star Extra, is optional equipment. It is sound-proofed with undercoating on the floor, sprayed on material on the doors and back panel, and roof insulation. Latter consists of 1½-in. thick glass wool pad cemented to the underside of the roof panel and covered with a perforated acoustic board as protection against heat and sound. Seats in this cab are provided with thick foam rubber pads on the cushion, and cotton and rubberized hair pad on the seat back.—*Ford Div., Ford Motor Co., Dearborn, Mich.*



Continuous Automatic-Feed Gluer

Here is a continuous automatic-feed gluing machine of simple design that is fast and efficient.

The entire unit, feeder and gluing machine, is permanently mounted on a portable stand. Operator controls the speed at which sheets are fed, or the control can be permanently set to feed at pre-determined intervals. Any weight of paper up to 5-ply index may be used.

Stock is fanned out on the feeding table and tapes convey sheet to the automatic air wheel that feeds sheet into the gluing machine. Side guides insure accuracy. An inexperienced operator quickly learns how to control delivery, using a foot pedal, which can be located in any convenient position.

Unit can be furnished in widths of 12, 21 or 27 in.—*Potdevin Machine Co., 1285 38 St., Brooklyn, N. Y.*

Avoids Frank Injury in Skinning

Development of a new frankfurt skinning machine, reported not to injure the product in any way, has been announced.

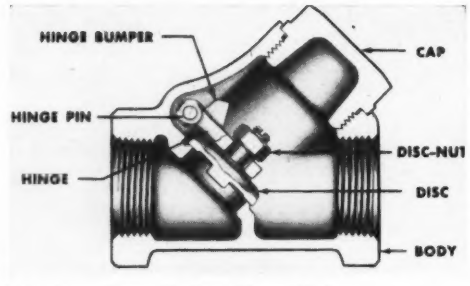
Machine consists of two units—a string remover and a casing stripper. String-removing unit is approximately 36-in. sq. and 43-in. high. A continuous straight-through machine, it removes strings at an adjustable speed of 40 to 120 per min. without damage to the casing.

An automatic control stops the machine on oversize franks that cannot go through. Strings are removed by unwinding, ejected by air pressure, and automatically deposited in a removable container of sufficient size to accommodate a day's output.

Stripper receives the continuous string of frankfurts from the first unit and a knife cuts the joints, separating the franks. Then the machine spirally unwinds the casing. A continuous flow of stripped franks is ejected at an adjustable speed of 20 to 60 per min. This unit is approximately 46-in. sq. and 43-in. high.

The separate units permit flexible floor layouts, and any desired inspection space may be provided between them. They have been designed to handle 25/32 in. to 27/32 in. dia. casings, and lengths from 4¾ to 5¾ in.

Materials used in construction of the machines have been chosen for maximum corrosion resistance and suitability for use with foods.—*Package Machinery Co., East Longfellow P. O., Springfield, Mass.*



Y-Pattern Brass Swing Check Valve

Improvements over the usual regrinding check valve are claimed for line of Y-pattern brass swing check valves in the 200 and 300 psi. classes. Large cap opening on same center line as seat opening permits easy access for regrinding or replacement of parts. Contours in the y-pattern offer minimum resistance to flow. Screwed end patterns are available from ¼ to 3-in., flanged end patterns in sizes 1 to 3-in.—*Crane Co., 836 S. Michigan Ave., Chicago 5.*

Cushioned Tires Save Time, Floors

Rubber tires of cushion type that are easier on plant floors and can be mounted and demounted in about a tenth of the time required for conventional pressed-on solid tires, are available on some fork-truck and towing-tractor models.

The cushioned tire is stated to incorporate all the advantages of long wear and cut-and-chip resistance found in its forerunner, which was pressed onto the wheels. It

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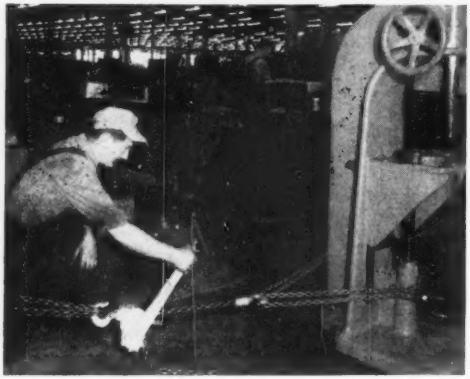
HI-WET-STRENGTH GREASE-RESISTING PARCHMENT

has a tapered hard-rubber base reinforced with bead wires, and can be applied to a tapered base wheel merely by bolting together the two wheel halves with a standard wrench. An Allen wrench removes plugs.

In test runs, mechanics have been able to remove a used set and mount a new set in 15 min., as contrasted with the several hours needed with the pressed-on tires.

At present, the cushion tires have been set as standard on gas Trucloader fork-lift models 1015 and 1024, on the electric battery-powered Trucloader 1024, and on the Clarkette-5 towing tractor.—*Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.*



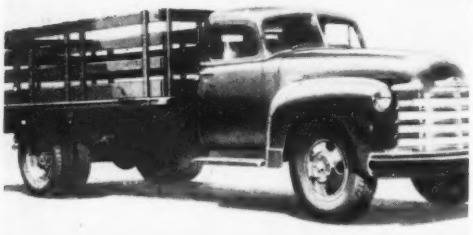
Add Link Chain to Pulling, Hoisting Unit

A link chain model of the Pul-Lift hoisting and pulling device makes possible such additional applications as work positioning, hoisting, and stretching of trolleys.

As illustrated in the photo, operation is as simple as using a wrench. At any point of the lifting or pulling action, the load is safely supported by a positive self-actuating load brake.

Safety top and bottom hooks open slowly without fracture when overloaded. The bottom hook is ball-bearing mounted for swiveling.

The link chain model is available in ¾-, 1½-, and 3-ton capacities.—*Philadelphia Div., Yale & Towne Mfg. Co., 11,000 Roosevelt Blvd., Philadelphia 15.*



Many New Features in 1951 Trucks

Highlights of 1951 line of trucks are better cab ventilation, improved seat construction, newly developed brakes, and increased durability engineered into chassis.

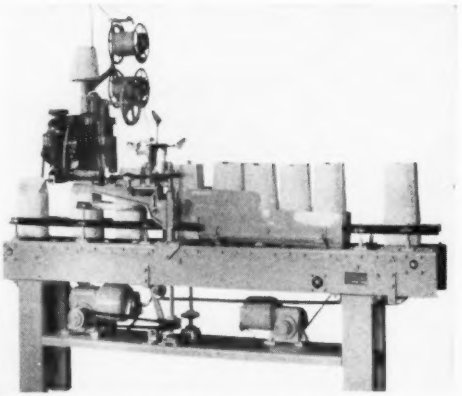
Ten wheelbases, including the 179-in. chassis, are available. Gross vehicle weights range from 4,000 to 16,000 lb.

Design of light truck brakes has been improved. In addition to more surface, the brakes are self-energizing. Less pedal pressure is required, and linings are bonded to the shoes, eliminating rivets.

Heavy-duty trucks now have Twin-Action rear brakes. Each brake is equipped with two cylinders and two shoes.

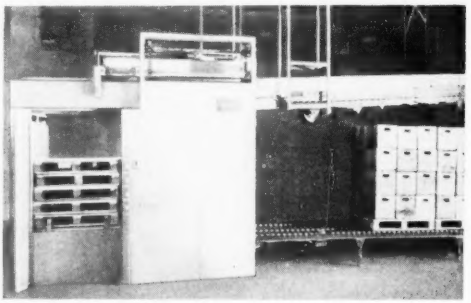
Seat assemblies on all trucks carry two layers of springs. Having different stiffness, frequencies of one layer tend to offset the other, thereby reducing vibration.

Cab side windows introduce adjustable venti-panes. Two engines are available, a 105-hp. Loadmaster and 92-hp. Thriftmaster.—*Chevrolet Motor Div., General Motors Corp., Detroit 2.*



Small Closer Handles 35 Bags a Min.

For medium-size sugar producers, this unit settles, tucks, and closes 5- and 10-lb. bags. It operates with any standard hand-spouted automatic weighing device. Up to 35 5-lb. bags can be closed each minute, 25 10-lb. bags. It accommodates bag sizes from 3 x 5½ x 12 in. to 4 x 7 x 16 in.—*Engineering & Machine Div., St. Regis Paper Co., 230 Park Ave., New York 17.*



Pushbutton Pallet Loader

Automatic pallet loading machine takes packages from conveyor lines and stacks them in predetermined and interlocking layers. Operating almost entirely by pushbutton control, it loads 30 packages a minute.

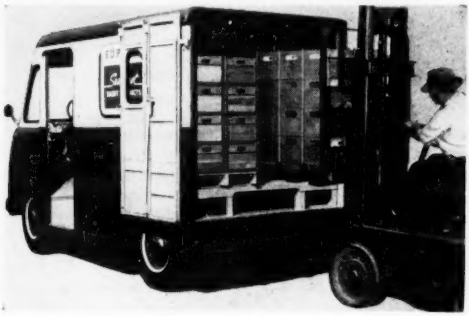
Hand piling can be eliminated, releasing valuable man-

power for more essential work in the plant. A definite saving in time and cost is reported.

Selection of load pattern is accomplished by pushbuttons. Capacities are influenced by the number of tiers per pallet, increasing them up to the capacity.

Empty pallets of the magazine are conveyed as needed to the pallet-loading areas. A hoist carries the pallet to top of loader to receive a layer of packages which rests on an apron. Apron is withdrawn from beneath, releasing packages and depositing them on the pallet below. A hoist then lowers the layers sufficiently to receive a second layer. As it is lowered, the pallet is rotated 180 deg., so that succesive layers are interlocked, resulting in a more stable pallet load.

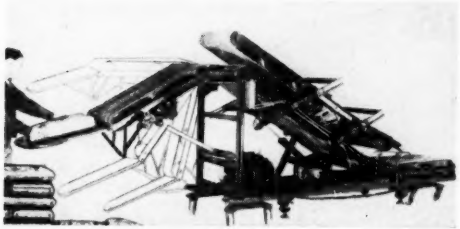
When the last layer is deposited, controls automatically start a conveyor and remove the loaded pallet from the machine. Simultaneously, the next empty pallet from the magazine is moved into position.—*Alvey Conveyor Mfg. Co., St. Louis, Mo.*



Milk Truck Bodies for Pallet-Loading

Special truck bodies have been designed for pallet-loading cases of milk bottles and cartons for both retail and wholesale delivery.

For retail operation, two pallets, 31 x 49 in., each holding 32 cases, can be loaded by fork lift truck. Load space is 75½ in. long, 73 in. wide and 58½ in. high at rear. This

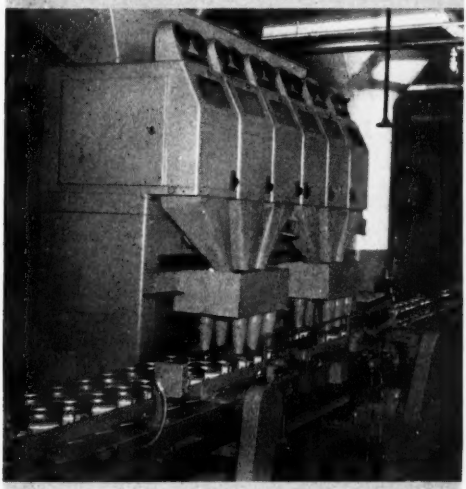


Flattens Bags, Loads Pallets

This power-driven bag flattener is designed for use as a pallet loader. Series of endless coil springs running over grooved rollers form the conveying medium. A tension spring and rocker arm connection between upper and lower conveyors applies a kneading and pressing action to the bag. Discharge conveyor section is raised or lowered hydraulically so that bags can be piled on pallets and follow the height of the tier.—*Flexoveyer Mfg. Co., 1220 S. Acoma St., Denver 10, Colo.*

31 PLANTS REPORT:

PACKAGING COSTS DOWN 65%*



...SINCE MODERNIZING WITH TRIANGLE PACKAGE MACHINERY

* average figure

THE FACTS. A before and after packaging cost study was recently made by Triangle in 31 Midwest plants. Each of these had replaced obsolete machinery or hand packaging methods with up-to-date Triangle machines. The boiled down results show an *average* savings of 65 percent due to Triangle Packaging Machines.

Typical Case Histories:

A *noodle manufacturer* cut his packaging costs $11,520 a year while increasing production 54 percent. A *candy packer* cut his packaging force from 11 girls to 6 and increased daily production in bags from 26,400 to 33,600.

A *peanut processor* jumped production 300 percent without increasing his packaging force. A *cookie plant* saves $200 a week. A *cranberry packer* is adding $3,500 per year to his profit.

If you are not right up to date with your competitors in your packaging methods, get in touch with Triangle at once. Triangle semi or fully automatic machines package any dry product into any style container by weight or by volume. For complete recommendations, send a sample filled package and state production required—no obligation.

TRIANGLE PACKAGE MACHINERY CO.

6659 W. DIVERSEY BLVD., CHICAGO 35, ILL.

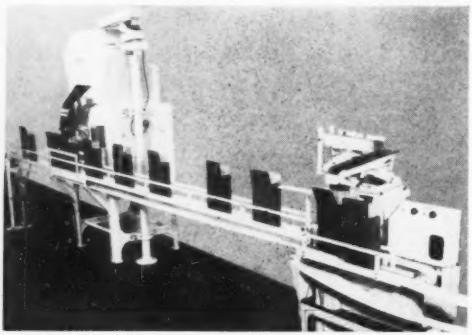
SALES OFFICES: San Francisco, Denver, Dallas, Atlanta, New York, Pittsburgh, Baltimore, Jacksonville. Branch Factory: Los Angeles.

Model MF-6 body is mounted on a Ford F-3 104-in. wheelbase chassis (photo).

Body is designed with square back and full opening rear. Flush rubber bumpers allow fork lifts to load pallets from platform or floor. Rear doors are double quarter type and can be opened full, or half way for delivery and loading empty cases. Ahead of the pallet loads is ample room to spread out 10 or 12 additional cases.

Wholesale deliveries can be pallet-loaded in a "Better-Built" body mounted on a Ford F-6 159-in. wheelbase chassis. It will handle 200 cases of milk, 40 to a pallet.

The body is all steel, with low step-wells. There are doors on both sides, and in the cab, as well as full-opening double rear doors. Regular 40-qt. milk cans can also be handled on the same pallets, stacked three high.—*Boyertown Auto Body Works, Inc., Boyertown, Pa.*



Two-Pass Automatic Weighing System

This new Hy-Tra-Lec automatic weighing system is claimed to achieve superior weighing accuracies and efficiencies.

The system is for filling cracker, cookies, and similar products, into rigid containers. Main units are two weighers connected by a conveyor. First unit (Model CE) net-weighs and prefills the boxes within appromimately 98 percent of the desired weight. The second unit (Model E) finish-fills at a piece-by-piece single-file rate to within 99 to 100 percent of the desired weight.

In a fully-automatic production line in which the containers also are set up, closed, and sealed by machinery, only one operator is stated required for as many as four separate systems.

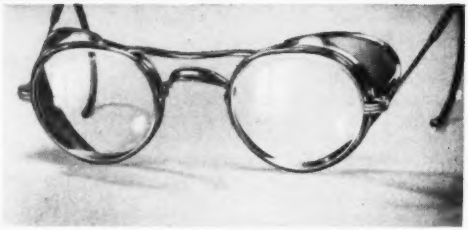
The product runs into vibrator feeds on both units by means of an overhead conveyor and via feed troughs that automatically divide the incoming flow into the proper proportions for each unit.

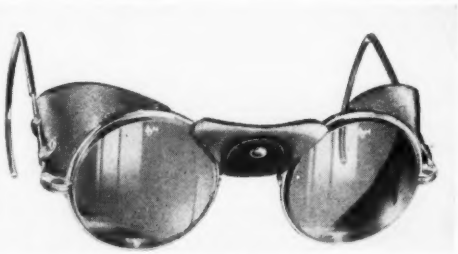
Containers on the conveyor are automatically stopped in the correct position to receive charges of weighed material on the first unit. When the box is in position, a combination telescoping spout and liner opener moves into, and holds open, the upper portions of the liner and boxes to facilitate bulk filling. After the box receives a weighing charge, it is released and travels down the conveyor to the finish-fill unit.

Here, the box is automatically placed on a weighing element, where it receives the last few pieces of product directly from the unit's vibrator feed. When desired weight is reached, the box passes to the closing station.

Added safety feature is a slack-filled carton ejector.

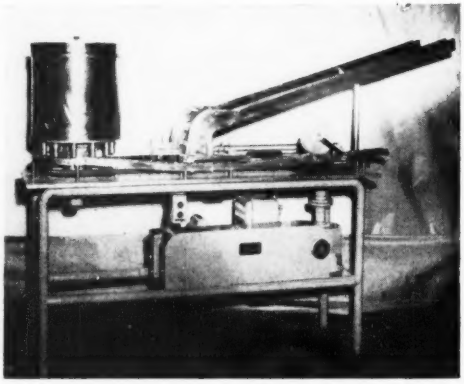
The Hy-Tra-Lec weighing method is based on the Archimedes principle of positive displacement. It has no spring or beam scales.—*Wright Mach. Co., Durham, N. C.*





Latest Models of Safety Goggles

Two improved series of safety goggles, the 7000 (top) and 3081, allow lenses to be replaced without removing eye shields. Former are metal and have brown temple tubing. Screws are Evertite construction, with countersunk, non-snagging heads. Eyewires are flat. The 3081 series has the same design features, but bridge and reinforcing bar are covered with a soft leather guard. Side shields protect against heat or cold, light and flying particles.—*American Optical Co., Southbridge, Mass.*



Spreads Crackers Automatically

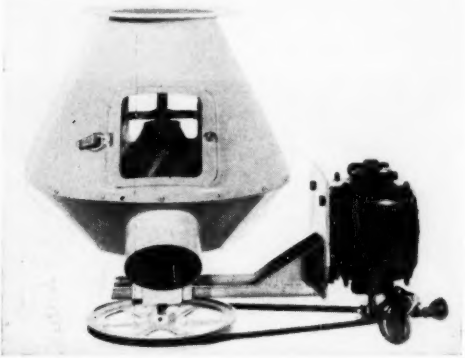
This new stainless-steel automatic sandwich spreading machine, with spread control, is reported to be capable of handling 200 to 600 crackers a minute.

Machine requires but two operators, as against four on other types of sandwich spreaders, thus resulting in lower production costs. The two operators feed the crackers to the machine.

Unit is synchronized to allow crackers to come into position to receive spread and then be conveyed to inspection and packaging table.

Entire mechanism is powered by a ¾ hp. 110v. motor. Speed can be adjusted for any rate of speed.

Products that can be processed on new spreader include square or round crackers, or cookies of cheese type, chocolate, waffle cone or ginger. Types of filling include cream, peanut butter, or others of similar consistency.—*Quality Machine Co., Athens, Ga.*



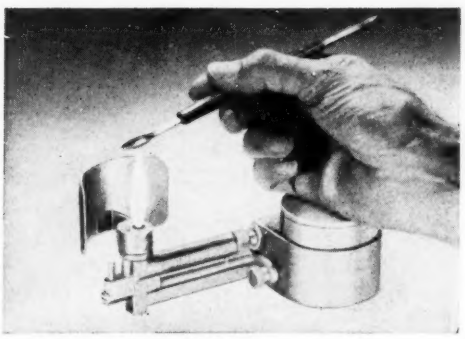
Device Divides Free-Flowing Dries

A continuous flow of dry free-running materials is reported readily divided into two to eight separate and equal streams by the new compact machine pictured here.

Known as the "Stream Splitter", it consists of (1) a heavy gage sheet steel housing, with top inlet and bottom outlets, and equipped with two clear plastic observation windows; (2) a ¼ or ⅓ hp. drive motor bracketed to the housing, powering the unit through a V-belt drive; (3) a stainless steel impeller and leather brush assembly inside the housing.

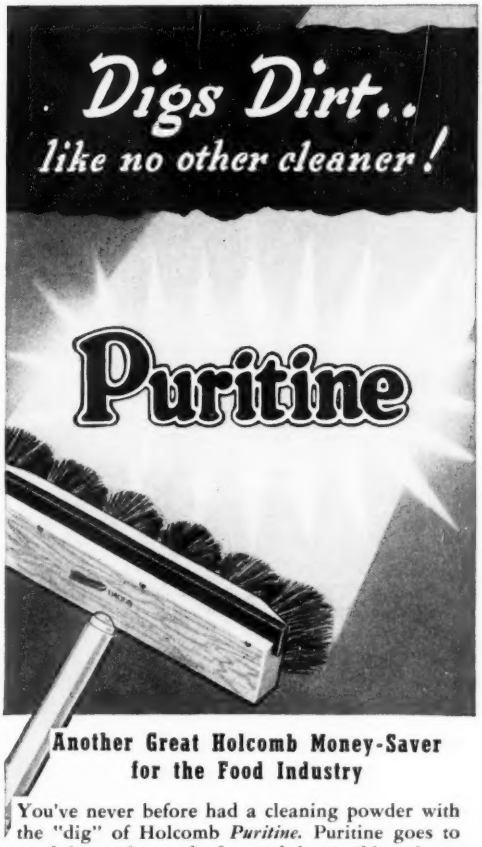
If desired, unit can be furnished with an explosion-proof motor and with construction throughout of non-sparking materials.

In operation, material enters at top, then strikes the



Pushbutton Gas-Flame Burner

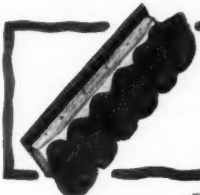
Just press the control and flame is on. That's the new automatic burner named Touch-O-Matic. As hand touches "on-off" platform, a full, regulated flame is produced. As hand is removed, it goes out, leaving only a low-burning pilot (next to flame in photo). For continuous flame, depress platform and turn slightly. Eliminated are accidents due to usual procedure of leaving full, invisible flame running—*Hanau Engineering Co., Buffalo, N. Y.*



Another Great Holcomb Money-Saver for the Food Industry

You've never before had a cleaning powder with the "dig" of Holcomb *Puritine*. Puritine goes to work instantly, works fast and thoroughly—cleans floors, walls, windows and equipment with ease. Puritine is a water conditioner, a cleanser, a free-rinser, too—and 100% soluble in hot or cold water. And like all Holcomb products, Puritine cuts cleaning time, cuts labor—costs less per year than any other cleaning chemical.

Use Puritine wherever you clean with water. Call your Holcomb Serviceman for all your cleaning needs. Factory, Indianapolis 7, branches in New York and Los Angeles.



Holcomb Handle Scrubbers

33,000 fast, dirt-digging fibers in 12 "bobs." End flared stock scrubs all the way up to the baseboard. Stock will not squat. No. 04066 for smooth and medium floors, No. 0120 for rough floor.

J. I. HOLCOMB MANUFACTURING COMPANY

Scientific cleaning materials

manufacturers of

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taste test try

SPISORESINS

The newest advance in the art of flavoring and the science of seasoning.

Spisoresins are special extractions of dry spices possessing all the flavor qualities and values of dry spices. Spisoresins produce a more uniform and finer flavor than dry spices and are also more economical to use and handle. Spisoresins meet the requirements of the Bureau of Animal Industry.

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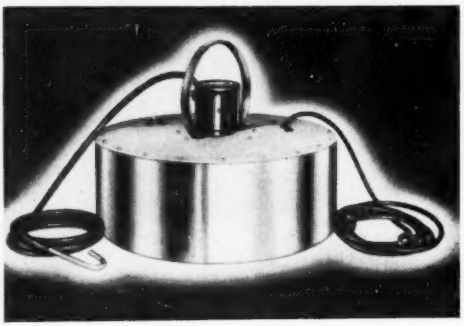
PERFUME BASES • VANILLA • FLAVOR BASES

impeller, which is rotating at approximately 300 rpm. Impeller is stated to agitate material into a uniform cloud which settles into the various outlets, giving an accurate division of flow.

Action of leather brushes on the lower end of the drive shaft makes sure that all material is swept into the outlets. A relief clutch prevents damage to the motor in the event of a stoppage on the downstream side of the unit. Capacity adjustment is made by raising or lowering the impeller on the drive shaft.—*Richmond Mfg. Co., Lockport, N. Y.*



Pumps Shortening Right From Barrel

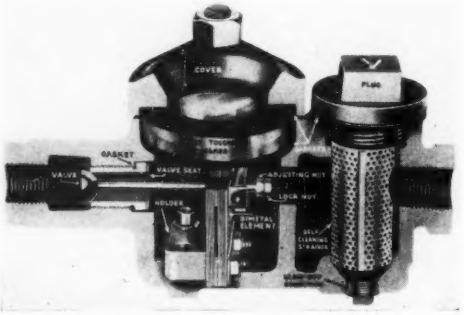
This centrifugal pump melts and pumps shortening directly from barrel into the fryer. Set right in the barrel, it starts melting its way down into the shortening. It will pump one-half barrel an hour.

Aimed at providing a steady flow of pre-melted shortening to maintain proper frying level, it can be equipped with float in fryer for automatic control of grease level. Thermostatic controls hold shortening temperature at about 200 deg. F.

The unit will empty all but the last few pounds of shortening from bottom of barrel. For less-than-barrel operation, rest of the shortening will be left solid.

Pump and hose are designed for self-cleaning so fat can't harden and clog operation.

Unit requires 1/25-hp., 60-cycle, 115v. a.c. single-phase motor. There is a centrifugal-type pump with 10 ft. of rubber hose. Diameter is 24¼ in., height 18⅛ in. It weighs 40 lb.—*Anetsberger Bros., Inc., 180 N. Anets Dr., Northbrook, Ill.*



Integrally-Designed Steam Trap

Steam trap with integral strainer has many new features. Combined in one unit are an air by-pass valve, check valve, strainer, and control glass.

Want *More* Information?

It's free—and easy to get. Simply note here the items on which you want more details, then turn to the Reader Service section inside the back cover, where all are listed by pages and by subjects under, "Editorial: New Equipment, Supplies"—each one with a page key number after it. The key numbers also appear on the handy Reader Service postcard. So you circle those for the items that interest you, sign at the bottom, and mail. No postage is needed.

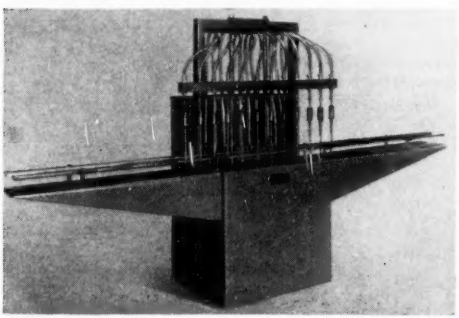
Only one orifice size is used. Trap can be mounted in any position. And it is stated not to be affected by sudden pressure fluctuations.

Referring to cross-sectioned view, air pressure keeps the discharge valve open. Incoming steam discharges previous condensate, and the steam heat acts upon the bimetal to close discharge valve, the thermal pull being greater than pressure power on the discharge valve. When steam condenses and water fills the body, temperature is lowered and the bimetal's thermal pull is decreased. Gradually, pressure power on the discharge valve overcomes the thermal pull, and the valve opens.

In the return line, sudden pressure fluctuation or discharging to overhead lines causes a back up. This automatically closes the discharge valve and prevents back flow of condensate.

Orifice is ½ in., but standard reducing couplings make it applicable on lines up to 2 in.

Pressure ratings are from 1 to 350 psi. Body is semi-steel with stainless trimmings, except for 350-psi. type having body of cast steel.—*Velan Engineering Co., 1 Exchange Pl., Jersey City 2, N. J.*



Report Filler Eliminates Air Absorption

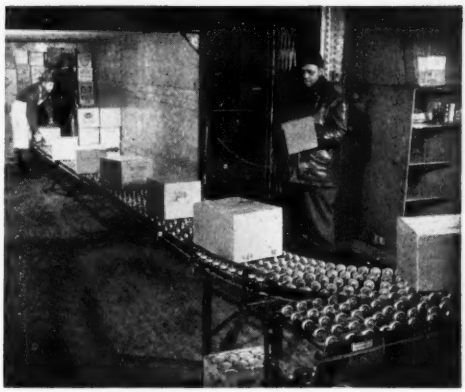
A new filler is designed to eliminate absorption of air into liquids. In wines, for example, oxidation can affect both quality and flavor, darkening white wines and changing the flavor of red wines.

Invented by Morris Turbovsky, the filler inserts its spout to within ¼ in. of the bottom of the bottle.

The Turbovsky unit contains a built-in reservoir which completes the filling of the bottle as the spout is removed, simultaneously creating a vacuum by removal of the spout. This eliminates oxygen from the bottles.

Both manual and automatic models are available. The former is a six-spout syphon filler. The latter, a straight line unit with 9 or 12 spouts, is of air actuated control-valve operation. In both types, all parts that have contact with the liquid are of stainless steel.—*Valley Foundry & Machine Works, 710 H St., Fresno 17, Calif.*

Better 3 WAYS



1 Rapistan Flexibility

Now a conveyor line can be fitted to your handling problem. Rapistan power and gravity units are adaptable to any floor plan—with rerouting as easy as moving furniture! New layouts can be made easily without expensive plant shutdowns.

2 Rapistan Quality

Performance is improved by such Rapistan features as exclusive "knitted frame" gravity conveyor design, for extra strength . . . grease packed ball-bearing conveyor wheels, lubricated for life!
One-piece power belt "box channel" bed construction, no welds!

3 Rapistan Value

Original cost of Rapistan equipment is low. Upkeep is kept at a minimum because bulk of flow system is low-cost gravity conveyor, with power units only at strategic points. Excessive handling is eliminated, storage space and man hour output greatly increased!

• *Write today for free general catalog and case histories! The Rapids-Standard Co., Inc., 493 Rapistan Bldg., Grand Rapids, Mich.*

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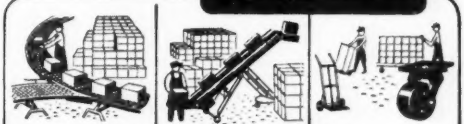
MATERIAL flow EQUIPMENT



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KATHABAR at Ohio Match, Wadsworth, Ohio

Constant, controlled-humidity atmosphere is of prime importance in match manufacture. Ohio Match found this control factor in the KATHABAR system of humidity control for comfort and process atmospheres. KATHABAR replaced 325 tons of bulky refrigeration; an expensive steam reheating plant; saved 400 hp of electric power; saved valuable factory space. Year-round production line operation was assured regardless of humidity conditions; example: on humid days KATHABAR removed approximately 100 gallons of water per hour.

Write today for this complete story and learn, as many leading manufacturers have, the importance of KATHABAR in your plant and offices.

The **Kathabar** system of humidity control for industrial processes and comfort offers you:

★ *FLEXIBLE OPERATION*—Prescribed humidity level maintained regardless of outside conditions—humidifies as well as dehumidifies.

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★ ECONOMY—Extra low operating cost—needs no licensed engineer.

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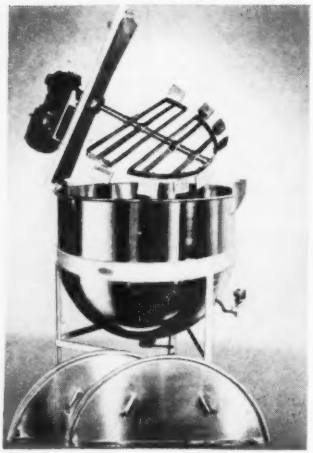
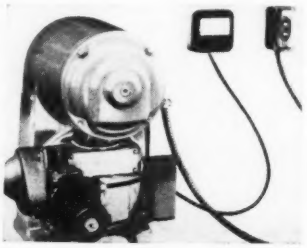


Stainless Mix-Cookers Heat Fast, Uniformly

New line of stainless steel steam-jacketed mix-cookers built to ASME specifications has been announced. Kettles are made for 90 and 125 lb. working pressures. Quick-opening bronze gate valves are standard, but stainless steel or nickel valves are available.

Steam space between the jacket and the heating surface of the bowl, plus large steam connections, facilitate fast, uniform steam distribution without loss of original boiler force and temperature. Steam spreaders are at every inlet. A cock releases air that is pocketed in the upper jacket area. Capacity of the hemispherical kettles ranges from 30 to 500 gal.—*Hamilton Copper & Brass Works, Inc., Hamilton, Ohio.*

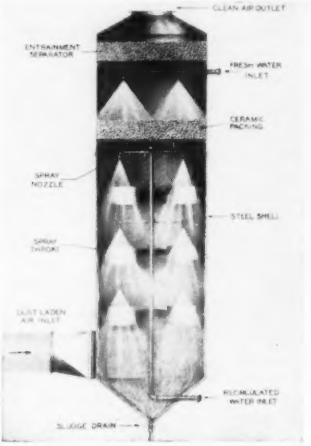


Pushbutton Operation Power Drive Control

An electric remote control for Speed-Trol electric power drives has been announced. It may be mounted on any size drive now in use.

Entire unit includes a mounting bracket, reversing motor, chain and sprockets, friction clutch, chain guard, and remote "fast-slow" station. It is available with or without a remote speed indicator.

Aim of new control is for pushbutton operation from a central point—*Sterling Electric Motors, Inc., Los Angeles 22.*



Advanced Design Features New Dust Collector

Efficient recovery of industrial dust which cannot be suppressed by conventional dry or wet centrifugal collectors is claimed with use of the Pemasco Dust Master Collector.

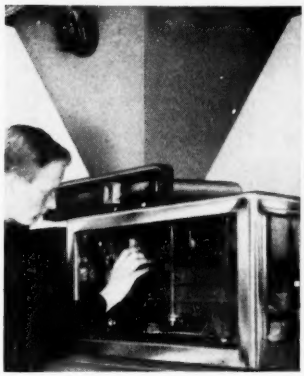
System is a compromise of the impingement collector, the spray tower, and the packed tower. It consists of four essential elements: Substantial steel shell, spray assembly, series of throat plates, and one or more beds of ceramic packing.

As dust laden air enters through the lower tangential inlet, it immediately contacts the wetted walls of the cylinder's lower section. Air velocity causes the dust to impinge against the walls with considerabl force, eliminating most of the larger particles immediately. Air is then forced upward through a series of throat plates, each of which is fitted with an overhead full jet spray nozzle so that the final divided spray completely fills the throat opening. Air then passes upward through a bed of loosely packed ceramic packing, which is also sprayed with water.

Each cubic foot of the packing contains a surface area of 52 sq.ft., presenting a relatively large impingement area. Since the packing is placed in the chamber at random, free air through the unit is reduced to about 70

percent of the original area—based on the free cross-section of the collector unit.

Maintenance is reported simplified in this new unit since there are no high-speed rotors, plates or cylinders, or baffles—*Prater Pulverizer Co., Chicago.*



Small Weigh-Belt Feeder Has 3 Cfm. Capacity

Midget belt Gravimetric feeder for dry chemicals has a capacity of 3 cfm. It feeds continuously by weight and has an 8-in. belt with a 1-ft. weigh span.

Among its features are: Feeding range of 100:1; positive non-flooding feeding mechanism in stainless steel; variable speed transmission; single ¼-hp. motor; hopper agitation proportional to feed rate; automatic alarm device; one-piece molded sprocket driven belt; and small stainless cabinet 17 x 30 x 17 in.—*Omega Machine Co., 345 Harris Ave., Providence, R. I.*

Unique Laboratory Pump Doesn't Touch Liquid

Seen as an ideal way to prevent contamination from metal parts in pumping is a new unit that provides continuous liquid or gas flow by a series of "fingers" that exert pressure on flexible tubing. In this manner, the material flows only through the tubing, and comes in contact with no other parts.

The pump can be adapted for process work, though designed for laboratory use. Called the Sigmamotor, it will handle 1½ to 30 gph. A number of different fluids can be pumped at the same time, entirely independent of each other, simply by

Our machines meet a great variety of packaging requirements.

Look about you in retail outlets and you'll see many packages that feature new and ingenious improvements — improvements that result in GREATER SALES . . . You will also find that in an impressive number of cases such sales-winning packages are being produced on machines designed and built by PACKAGE of Springfield.

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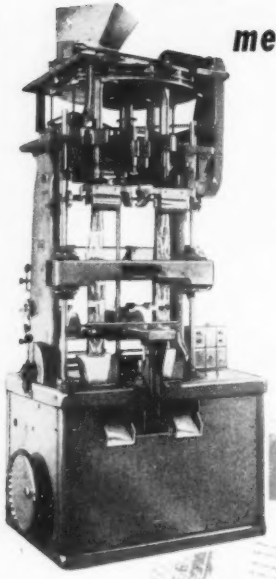
a better "BAG" means PLUS sales ... at lowest costs



Show your product. Step up your sales with a package that will lead the competition in today's self-service merchandising. Transwrap gives you more eye-appealing package — a package that shows your product — ***lets it sell itself.*** *The first automatic packaging machine to satisfactorily heat-seal polyethylene at high speeds, Transwrap offers you the biggest buy in economy packaging today.* **If you use any of these heat-sealed "bag" materials, Transwrap can cut your packaging costs in half:**

- ☐ Polyethylene
- ☐ Fluoflex
- ☐ Cellophane
- ☐ Vinylite
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- ☐ Metal foil
- ☐ kraft papers
- ☐ "tea bag" papers
- ☐ laminated stock
- ☐ vegetable parchments

Volumetric Unit *— designed to package larger-sized, free-flowing products—40 to 75 units per min. Meters down to 1 item per package—up to use-limited quantities (within 20 cu. in.). Fed by volumetric cups. Pillow packages—with or without gussets . . . 1-13/16"x3" to 5¼x13". Size—4'x5'x 8½'; wght. — 2330; ¾ h.p. geared motor; 1640 volts.*

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inserting more tubes through the unit.—*E. & M. Enterprises, Inc., Middleport, N. Y.*

Automatic Feed Control In Large Chlorinizer

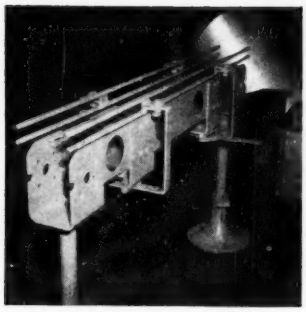
Automatic control of feed rate to three individual points is featured in a new high-capacity chlorinizer for water disinfection, industrial waste treatment, and control of slimes in cooling water systems.

Unit, says maker, insures that chlorine dosage at any point of application will be properly controlled and metered for any pre-determined period. Gas flow is visible.—*Builders-Providence, Inc., Providence, R. I.*

Here's New "Fog" Unit For Sanitizing Tanks

Tank trucks, milk tank cars, storage tanks, and vats are reported quickly sanitized with this new fogging equipment.

Basically, the outfit is an air brush specially designed to force a cloud of finely atomized sodium hypochlorite or quaternary ammonium compound into



Easily Adjusted Guard Rail

Newly designed guard rail on conveyor line is stated to eliminate wasted time of changing adjustment every 5 ft. or so. Position is changed instantly at a central point at either end or any intermediate position along the straight section.—*Island Equipment Corp., 27-01 Bridge Plaza N., Long Island City 1, N. Y.*

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the tank through any convenient opening. Immediately, the entire interior is full of sanitizing fog, all surfaces being covered.

According to the maker, only a small amount of sanitizing solution is required for even large tanks. After fogging interior of tank, the opening used is closed until equipment is again ready for use.—*Klenzade Products, Inc., Beloit, Wis.*

Horizontal-Plate Beer Filter Keynotes Sanitation

New beer filter is claimed to achieve a high level of sanitation, while imparting a brilliant final polish. Utilizing horizontal plate principle, filter makes possible use of a pre-fabricated medium and diatomaceous filter aid which are arranged to prevent any falling off of beer quality, even toward end of filtration cycle. Air pockets are eliminated.

Maker states secure bolting of the filter plate cartridge and precision machining prevent possibility of by-passing so that increased pressure differentials and decreased flow rate determine the end of cycle.

All surfaces may be exposed for easy cleaning and inspection. Plates are bolted together in cartridge form, enabling all of them to be removed or inserted together. Made of polished stainless steel, Everdur, or other weldable bronze throughout, filter is designed for working pressure of 100 psi.—*Sparkle Mfg. Co., Mundelein, Ill.*

Increase consumer demand . . .
Raise flavor levels . . . with

Huron **MSG**
MONOSODIUM GLUTAMATE 99+%
and
Huron **HVP**
HYDROLYZED VEGETABLE PROTEINS

For that perfection in food flavor which assures enthusiastic consumer acceptance and continuing demand . . . many food processors have already found Huron MSG and Huron HVP valuable aids in raising flavor levels.

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ORIENTAL TYPE FOODS:

Both MSG and HVP have long been recognized as required ingredients in Oriental type foods, chop suey, chow mein and similar dishes now so popular with the American public. In those Oriental foods which have poultry, seafood, pork, veal or vegetables as a base, MSG gives the greatest flavor improvement at a level of 0.2%. When the base is primarily beef, the Hydrolyzed Vegetable Proteins are more useful because of their flavor character, akin to that of braised meat broth. Huron HVP Seasoning liquids will give optimum taste improvement at levels ranging from 0.25% up to 1.0%. A number of liquids are available to best suit color, flavor and processing requirements of each recipe.

Call on us in confidence for assistance. Samples will be sent immediately with specific recommendations.

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THE Complete LINE

Keep Those Glasses Clean

Silicone-treated tissue for cleaning glasses and goggles in factories and offices are made readily available with this simple dispenser. Called "Magic Lens Tissue," it comes in sealed cartridges, and sheets are interfolded for simple dispenser handling.—*The Silicone Paper Co., of America, Inc., 230 Park Ave., New York City.*

Equipment Briefs

Two Insulation Layers Better

Molded insulation in two layers instead of a single layer of equivalent thickness gives safer and more efficient service where fire hazards are present. A double layer permits use of staggered joints, thus doubling the protection against open joints.—*The Magnesia Insulation Manufacturers Assn., Washington, D. C.*

Laboratory-Size Demineralizer

Supplying up to 10 gph. of pure water, new demineralizer has permanent cartridge and sight flow meter. It is an ion exchange unit. When resin needs replacing, cartridge is simply emptied and refilled. Electric conductivity meter provides continuous visual indication of quality of water. It may be attached to any wall near a tap.—*Penfield Mfg. Co., 19 High School Ave., Meriden, Conn.*

Low Range Speed Reducer

A torque-arm reducer for output speeds from 115 to 330 rpm. is announced. Said to be the only shaft-mounted unit designed for this speed range, it's available in 4 sizes for capacities up to 27 hp. It can be driven with V-belt, flat belt, or recommended Taper-Lock sheaves.—*Dodge Mfg. Co., Mishawaka, Ind.*

Bacteria Test Kit

Consisting of a stand, sterile swabs, and sterile bottles containing a gelatin-like agar substance, bacteria test kit is designed for checking food plant cleanliness. User swabs surface to be tested, wipes swab on agar, then seals bottle. Bacteria colonies will be indicated by spots appearing in one to three days.—*Belfer Laboratories, Peoria, Ill.*

—End

THE BEAGLE is always ready for the hunt. He is accustomed to hunting in a pack and when in action waves his tail gaily and obeys all commands quickly and cheerfully. Beagles should stand no higher than 15 inches.

In Boxes, too

The Pedigree is Assurance of Thoroughbred Stock

A "PEDIGREED BOX" results from integrated production, with quality control by one management from timber to finished box.

That's why American Sugar Refining Company uses Union boxes to provide safe packaging for Domino sugar from refinery to dealers' shelves.

75 years of undisputed leadership in paper packaging goes into Union boxes. Tremendous forest resources feed five of the largest paper machines in the world, in a completely integrated pulp-to-container plant unmatched in America for size and production. And four modern box plants, strategically located, serve you promptly and dependably.

Add all these *extra* assurances of consistent quality, dependable service and fair price and it's easy to see why every month more makers of national brand products are shipping in Union boxes.

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CERTIFICATE OF BOX MAKER
THIS BOX CONFORMS TO ALL CONSTRUCTION REQUIREMENTS OF CONSOLIDATED FREIGHT CLASSIFICATION
BURSTING TEST 200 LBS. PER SQ. INCH
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GROSS WT. LT. 65 LBS
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Cane Sugar
Old Fashioned Brown
American Sugar Refining Company

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UNION

Dependable Packaging Since 1872

UNION Corrugated Containers

UNION BAG & Paper Corporation

Principal Offices: WOOLWORTH BLDG., NEW YORK 7, N. Y.

***Corrugated Container Plants:* SAVANNAH, GEORGIA • CHICAGO, ILLINOIS • TRENTON, NEW JERSEY**

New Packages and Products

Tubed Cheese Assortment

Attractive assortment of cheese spreads in tin tubes has recently been introduced by Sue Ann Food Products Corp., Chicago. They're featured under tradename Cocktail Delight.

Each of the five tubes contains 2 oz. of pasteurized process cheese. Flavors are (l. to r.): Sharp, roquefort with brandy, smoked cheddar with port wine, and Edam with sauterne wine.

English Biscuits in Radical Package

Now being imported into the U. S. is a line of English biscuits designed to compete with moderately-priced American goods in supermarkets and chains. They are packaged in a newly devised wrap that eliminates the normal cardboard closure.

The new package consists of a paper liner next to the biscuits, then a greaseproof corrugated fiberboard, waxed paper, and a fiber paper outer seal. Scribbans-Kemp (USA) Ltd., New York subsidiary of the London firm of the same name, states that its biscuits will remain fresh for periods longer than six months.

It was also stated that the relatively low rigidity of the package is not expected to be a problem during the boat trip from England or in subsequent warehousing. Two dozen packages will be placed in a carton, with four cartons to a master carton.

By April, six varieties will be on the market. The four pictured here are Bourbon (chocolate fingers with cream filling), Carlton (swirls with orange fondant), and Shortcake and Devon (both plain cookies).

Smart Redesign Wins New Customers

Case-Swayne Co., Inc., Santa Ana, Calif., credits its sales rise during recent months to a gradual introduction of redesigned labels on its line of 50 fruits and vegetables.

Millions of old labels had been on hand for many items, so it was decided to make the changeover gradually, starting with those products where labels were in relatively short supply.

One good example of smart redesign is the freestone peach label. Three-quarters of the old peach label had a full-color photo of the peach halves. However, brand identification appeared on only the other quarter—and this quarter was the part of the can most commonly displayed to the prospective buyer. And if the illustration portion was put forward, the buyer would not see the product or brand names.

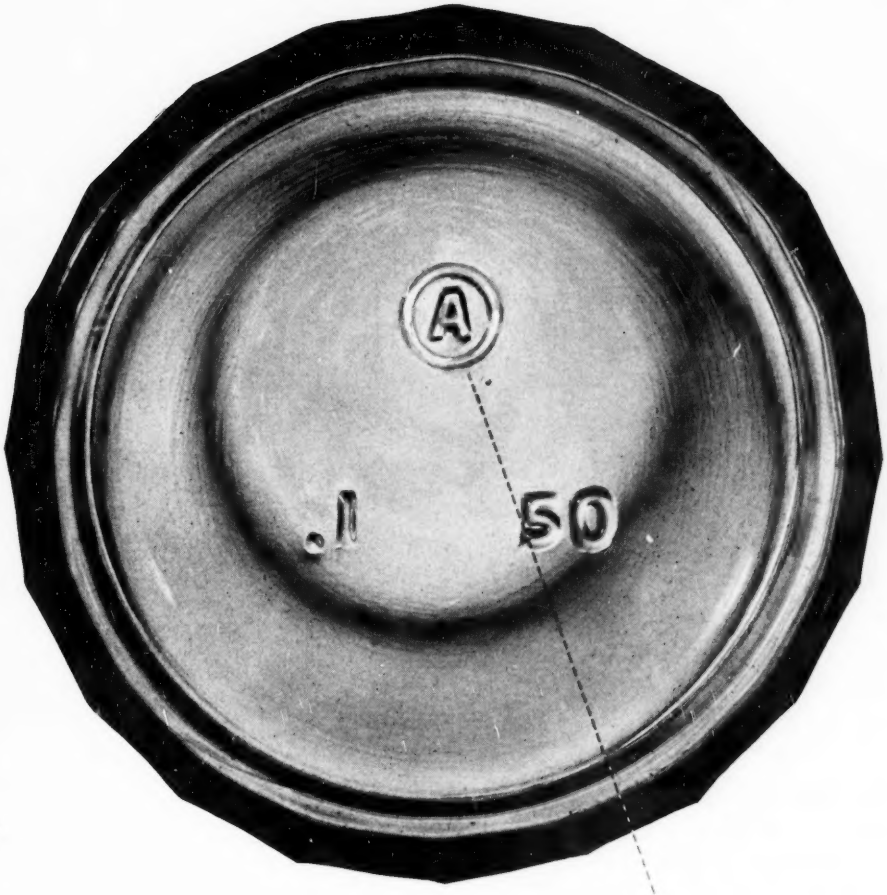
The new label shows a bowl of peaches against a white background with product and brand identification in the same vertical panel. This illustration is repeated, so now it is virtually impossible to place the can on a shelf without displaying all factors prominently. Top and bottom bands are in red.

Cheese-Flavored Paste

New product for the baking industry is cheese flavor, in paste form, put out by Kraft Foods Co. It's for cheese breads, rolls and crackers, and wherever else a sharp natural cheese flavor is required.

Naturally aged cheddar cheese is used in the product, called Golden Brown Bakers' Cheese Flavor. Maker says repeated test show the flavor is retained during the baking process. And toasting by consumers brings out the cheese flavor even more sharply.

New product comes in 30-lb. tins, distributed exclusively by the Phenix Pabst-ett Co.

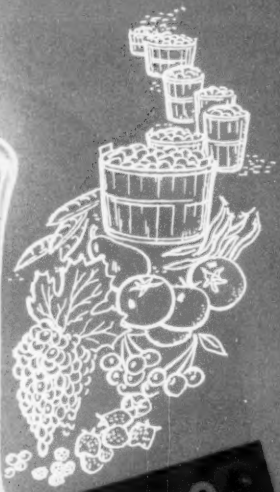


The mark of accurate glass finish

One of the many reasons Armstrong's glass containers perform well on any filling line is the accuracy of their finish. A pioneer in perfecting glass finish, Armstrong offers you containers unequalled for sure safe seal. Ask your Armstrong representative for details or write to Armstrong Cork Company, Glass and Closure Division, 4202 Prince Street, Lancaster, Pennsylvania.

ARMSTRONG'S GLASS

HEYDEN PRODUCTS



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SODIUM BENZOATE U.S.P.

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BENZALDEHYDE N.F.

Synthetic oil of bitter almonds. For flavoring and aroma in canned fruits, fruit beverages, cake mixes, candies. Shipped in 425 lb. drums, 100 lb. carboys, and 50 and 25 lb. boxed tins.

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U.S.P. Powder and Saccharin Sodium U.S.P. Powder and Granular.

BENZOIC ACID

Widely used as a preserving agent. Shipped in 100 lb. bbls.; 50 and 25 lb. fiber drums.

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Synthetic oil of wintergreen. For flavoring confectionery and beverages. Shipped in 500 lb. drums and 50 lb. tins.

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Salicylic Acid • Streptomycin

Candy With Holiday Flower

For each holiday, this candy package has a different corsage, variously colored ribbons and different-colored flint-covered base. Curries Ice Cream & Candy Co., Los Angeles, in conjunction with Good Humor Co. of Calif. developed this flexible package idea.

Bases come in white, pink, red and green. Box lid remains constant, being a bright gold foil wrapped in white chip. These simple changes enable the company to continue to take advantage of low-cost volume production.

The box contains 1¼ lb. of candy in two layers. Separate container for the flower allows packing of this item at the florist, then delivery fresh to the candy stores. Gold foil is on both lid and corsage insert, embossed with scrolls in pink. Clark Paper Box Co., Los Angeles, is supplier.

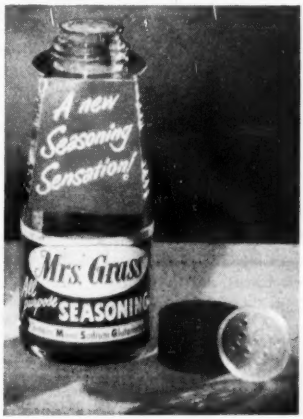
Jar Has Unique Re-Use

Both a new container re-use value and a new product are represented in the photo above.

The container is a vacuum-packed glass jar that can be re-used as a measuring container in the kitchen. Markings for different cup levels are incorporated on the sides of the jar.

The product is whole, machine-peeled size-graded tomatoes for use in salad preparation, packed this last season by P. J. Ritter Co., Bridgeton, N. J. Three tomatoes are packed in a clear liquid pressed from other tomatoes. For effective store display, jars and labels are inverted.

Vapor-Vacuum caps are supplied by the White Cap Co.



Plastic Caps for Seasoning

All-purpose seasoning containing combination of salts, spices and monosodium glutamate is being introduced in a Duraglas jar with a perforated polyethylene snap cap and a screw-type plastic closure.

The snap cap enables housewife to shake seasoning right on, but it can be removed easily for measurement by recipe. Plastic closure helps exclude moisture.

Reported to add taste-appeal to meat, fish, poultry, vegetables, salads,

IN 1/10,000th SECOND WE LEARNED A LOT!

Recently we photographed the deck of a Specific Gravity Separator while it was actually oscillating at 400 strokes per minute . . . Using electronic light at 1/10,000th second, the results graphically revealed how even the slightest adjustments of deck inclination, speed of vibration, and air volume control, are infinitely reflected upon various types of dry food products being cleaned, classified, and salvaged . . . Facing a future of processing poorer quality raw products? . . . S S & S equipment (Specific Gravity Separators and Air-Float Stoners) may be *your* profitable answer, too.

NOW UNDER EXPERIMENT — *The separation of frost damaged mustard from useable mustard seed. (See below.)*

Have you written for your copy of *"Nothing Ventured?"* . . . a folder which describes briefly an opportunity for the imaginative process engineer to prove conclusively whether or not the S S & S Process can provide immediate solutions to *specific* separating problems. Free copies, from the second printing, are being mailed to supervisory personnel upon request. . . Also available is literature giving engineering data, installation drawings, etc., on all models of Separators and Stoners.

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OFFICES IN PRINCIPAL CITIES OF NORTH AND SOUTH AMERICA

dressings, eggs, gravies, soups and juices, the seasoning is made by I. J. Grass Noodle Co., Chicago.

The 2½-oz. shaker jar, plastic closure and snap cap are supplied by Owens-Illinois Glass Co., Toledo, O., while the red, white and blue label is made by Milprint Inc., Milwaukee.

Change Label, Brew, Bottle

A new brew, a new label and a 12-oz. one-way bottle have recently been introduced by Acme Breweries, San Francisco.

Slight changes have been made in the formula to produce a lighter, drier lager beer. The familiar Bavarian hop girl label has been replaced by a gold oval label highlighted by a delicate imprinting of hops and leaves within the gold band. Printing is in red and black on white. This design recently received second grand prize at the International Trade Exposition held in Brussels, Belgium.

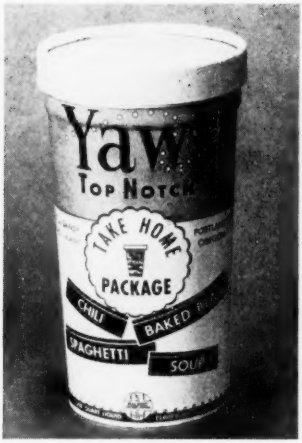
The one-way bottle is making its first appearance in California.

New Resins for Can Lining

Shell Chemical Corp. is manufacturing a series of resins that are seen of use as can coatings, drum linings and for heat resistant coatings. Known as the EPON series, the resins combine three important properties: Chemical resistance, adhesion and flexibility.

When tested as a coating for a tank holding 25 percent sulphuric acid at temperatures as high as 210 deg. F., it held up for 16 months continuous operation.

The resins can be described as a new class of condensation polymers with ether linkages between carbons and relatively wide distances between functional groups. Raw materials are epichlorohydrin, acetone, phenol.



All-Temperature Container

An all-purpose, all-temperature plastic coated nested container is being made by Sealright Co., Inc., Fulton, N. Y. It should find application for many food products.

New container is plastic coated with a non-absorbent material on sidewall, top and bottom. It has a leakproof bottom.

The package has been commercially tested successfully for the following uses. Foods can be put in the container hot, then frozen and merchandised at retail. Individual chicken pie, pork and beans, and baked custards can be baked in the oven then sold in the same container. Carbonization in lively beverages is held. Ice cream makers report finding product flavor and texture excellent, and the slick spooning out surface of the container has won consumer friends.

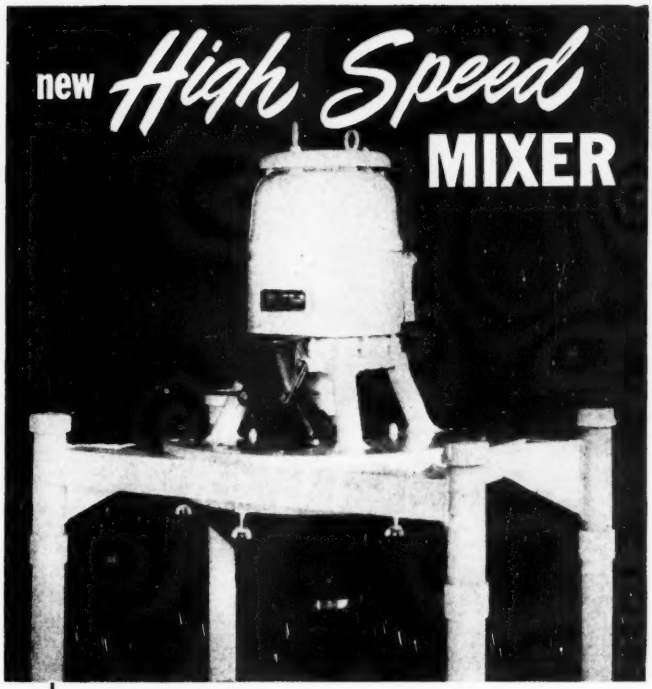
Package & Product Shorts

Families Test Frozen Apple Juice

Washington State Apple Commission and BAE are testing frozen concentrated apple juice among 200 families (600 persons) in the San Francisco Bay area. Goal of the research is a new market outlet for lower grade apples, particularly that grade of the Delicious variety. Panel of 96 tasters selected three blends being tested.

Moistureproof Liner for Milk Solids

A moistureproof, siftproof carton liner of polyethylene laminated to greaseproof paper is now being used by the Borden Co. for its finely powdered Starlac non-fat dry milk solids. The liner, made by DuPont, is stated to be adaptable to automatic set-up in the carton and to work well with automatic filling and heat sealing. Problems overcome were the milk solids tendency to seep through crevices in packages and to absorb moisture and become lumpy.



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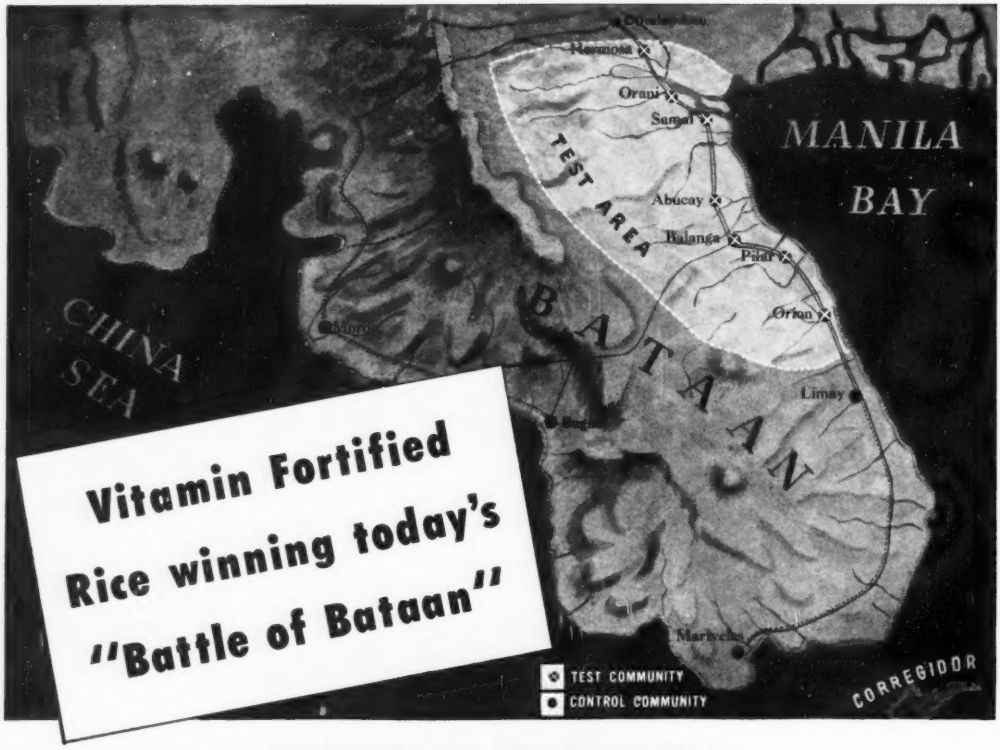


Vitamin Fortified Rice winning today's "Battle of Bataan"

RESULTS OF TREMENDOUS NUTRITIONAL EXPERIMENT USING VITAMIN ENRICHMENT

★ **Symptoms of 2nd most fatal disease reduced 70%**

★ **Beriberi deaths steadily falling**

In an experiment in the Philippines now involving over 90,000 persons, conducted with the approval of the Philippine government and medical associations, and in which Hoffmann-La Roche is proudly cooperating, remarkable health benefits from rice enrichment have been demonstrated. This is reported by Juan Salcedo, Jr., M.D., M.A., Director of Nutrition, Institute of Nutrition, Manila, P.I.

With rice the principal food, and beriberi the No. 2 cause of death, this new "Battle of Bataan" was planned and waged to determine whether enrichment of rice would reduce the incidence of beriberi. Bataan Province was selected because of its high beriberi mortality and because rice traffic could be readily controlled there. (Early investigation showed enriched rice completely satisfactory in taste, color, odor, palatability and digestibility.)

*"There are indications from raw data available from the present clinical beriberi resurvey that the beriberi incidence has been reduced by 70%."**

Beriberi mortality rates have also steadily dropped in the "enriched rice" area without significant change in the control area.

★ **Infantile beriberi virtually eliminated**

This dramatic and specific evidence of the benefits of vitamin enrichment should have a vital effect in improving the health of peoples all over the world.

WHAT THIS MEANS TO YOU

While this experiment concerned white rice, it proves the benefits to public health through enriching white bread and rolls, family white flour, and other processed cereals. Any miller of wheat, rice, or corn—any baker—any macaroni and noodle manufacturer, who is not now regularly enriching his products may well ask himself if he can any longer afford to withhold such extensive health benefits from his share of the consuming markets.

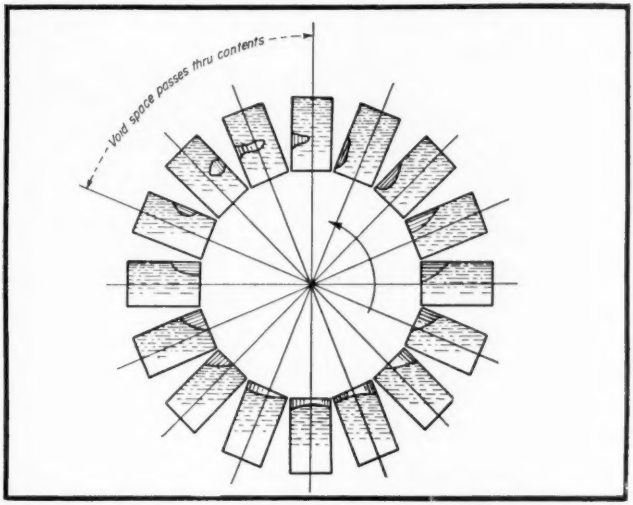
*Quotation from latest of published interim medical reports. *Write for reprint.*

ROCHE

VITAMINS FOR ENRICHMENT

VITAMIN DIVISION • HOFFMANN-LA ROCHE INC. • NUTLEY 10, N. J.

New Technology



End Over End Rotation of Cans During Processing Speeds Heating and Cooling, Improves Product

Sterilization of food products which are liquid, semi-liquid, or solids in liquid, in sealed cans may be accomplished quickly and at high temperatures and pressures by a patented method in which the position of the container is continuously changed. Thus the mobile liquid component and gaseous space will cause some agitation of the solid contents and increase their exposure to the hot surfaces of the can. Most advantageous method of producing the desired movement is to mount the cans for rotation in a vertical plane about an axis which is outside the can, for example about a can's length away from the inner end of the cans. A number of cans mounted in this way will form a wheel-like structure which, in rotation in a retort, will cause the cans to turn end-over-end in the heating medium.

When sterilization is complete, cans may be rotated in like manner in a cooling medium. Rotation is regulated at a speed such that centrifugal force and the weight exerted by the contents will cause the gaseous space to move along the walls and through the center of the cans, as shown in the above illustration. This will cause turbulence and rapid circulation of the liquid content and facilitate heat transfer to the center of the cans. Temperature of the heating medium should be maintained at approximately 260 F.

Specific benefits which may be derived from application of the new method are: (1) More rapid heating of contents of can and, therefore, shorter exposure time required to sterilize them; (2) prevention of overcooking or scorching of products near surface of can due to continuous change of the product position; (3) better flavor, color, and nutritive value and, with some products, better texture; (4) less sulphide staining of the can; (5) increased production rates resulting from use of shorter process time, and (6) increased vitamin retention.

Digest from U. S. Patent 2,517,542, issued Aug. 8, 1950, on an application dated Nov. 18, 1946, to L. E. Clifcorn, G. T. Peterson and J. M. Boyd, Chicago, assigned to Continental Can Co., Inc., New York City.

Fresh Strawberry Caps Removed by Freezing

Caps and stems are easily removed from fresh strawberries by a patented freezing process. In this operation caps become brittle and are easily detached from the berries by agitating them in a freezing solution preliminary to further freezing. In carrying out the process the berries are first immersed in a refrigerating medium at 0 F. Liquid and berries are so proportioned in the tank that the latter are distributed and suspended to form a fluid mixture. This mixture is then pumped through a tubular conduit in another chamber where the surrounding medium is maintained at −5 F.

When the berries first come in contact with the cold medium, leaves of the cap are almost instantly frozen; and in their subsequent travel, through the tubular conduit at a still lower temperature, the caps and stems are broken from the rigid berries. At the discharge end of the conduit the mixture flows over an inclined screen which retains the berries and allows the caps to pass through. A final spray of cold water may be used to remove the few adhering particles of stem and cap.

Digest from U. S. Patent 2,508,728, issued May 23, 1950, on an application dated Apr. 5, 1949, to J. H. Stansbury, Wrightville Beach, N. C., assigned to Stansbury, Inc., Baltimore, Md.

Lactic Acid From Potctoes

Potato surpluses of recent years are a ready and plentiful source of starch for conversion into sugar and subsequent fermentation to lactic acid. Potatoes are prepared by grinding in a hammer mill and cooking in an autoclave at 266 F. for 1 hr. Cooking is required more for sterilization than for conversion of the starch. Amylase for saccharification of the starch was produced by inoculating cooked potato slurry with a culture of *Aspergillus niger* N.R.R.L. 330 or 337, previously grown with aeration on saccharified

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potato slurry. Conversion of the starch to sugar took place in ½ to 2 hr.

Three species of lactic acid bacilli were used, one of unknown species, *Lactobacillus delbruckii* N.R.R.L.B.—445, and *L. pentosus* 124-2. The last-named gave the best yields, based both on the original carbohydrates (up to 91.2 percent) and on the sugar consumed (up to 95.2 percent). Fermentations were carried out at pH 5 to 6 using $CaCO_3$ to maintain this pH. Temperatures of 86 F. were used for *L. pentosus* and 133 F. for *L. delbruckii*. Lactic acid was recovered from the calcium lactate by acidifying with H_2SO_4, esterifying with methanol, distilling off the methyl lactate, and saponifying the recovered ester with water. An average of 85.5 percent of the lactic acid in the mash could be recovered by this method. Based on 14 percent starch in the raw potatoes, and an average recovery of 85 percent, 100 lb. of fresh potatoes should yield about 13 lb. lactic acid.

Digest from "Lactic Acid from Potatoes", by T. C. Cordon, R. H. Treadway, M. D. Walsh and M. F. Osborne, *Industrial and Engineering Chemistry*, Vol. 42, No. 9, 1833-36. Sept., 1950.

FISH

Occurrence of Vitamin B_{12} In Fish Products

Recent experimental work has determined the amount of vitamin B_{12}-active substances in a wide variety of fishery products—fish organs and flesh, condensed fish solubles, stickwater before condensing, and fish meals, including little neck clams. Results are reported as mμg of B_{12} per g. dry material, and the amounts vary from 96 in dogfish liver to 18,000 in sockeye salmon kidney. Determinations were made by microbiological assay using *Lactobacillus leichmanni* as test organism. Internal organs of fish proved to be good sources of vitamin B_{12}, with the single exception of dogfish liver. Muscle tissue of white-fleshed fish and halibut heads were poor sources. Condensed fish solubles were generally good sources, as were stickwaters from salmon offal reduction. Fish meals were not particularly good sources, but clams were excellent.

Some preliminary work of a qualitative nature was done on the separation of vitamin B_{12}-active substances by filter paper chromatography. Experimental work was also conducted on the microbiological formation of vitamin B_{12}-active substances in stickwater. Of 85 bacteria grown in vitamin B_{12}-free liquid medium, 25 formed exhibition zones when their growth medium was tested by cup-plate assay on the same medium solidified with 2

percent agar. Further work showed that a *Serratia marescens* grew well in stickwater and increased the natural vitamin B_{12} content 4-5 fold. Three cultures of *Streptomyces griseus* have been tested and are under further investigation.

Digest from "Vitamin B_{12}—Active Substances in Fish Products," by H. L. A. Tarr, B. A. Southcott, and P. W. Ney, *Food Technology*, Vol. 4, 354-57, Sept. 1950.

BAKING

New Flour-Aging Chemical

Use of monochloramine or dichloramine, or both, for aging wheat flour and enhancing its baking qualities has recently been patented. These chemicals are intended to supersede other chlorine compounds which bleach as well as oxidize the flour, but which have some objectionable properties. The preferred method of using the process is to pass chlorine through a solution of ammonium chloride containing sufficient buffer (sodium borate in potassium chloride) to maintain a pH greater than 8.5. The gases thus formed are driven off by passing air through the liquid, then they are conducted to maturing chambers of a type well known in the art. The amount of chlorine required for this process is said to be a fraction of that necessary in the use of nitrogen trichloride.

Digest from U. S. Patent 2,510, 146, issued June 6, 1950, on an application dated Feb. 10, 1948, to Maurice L. Silver, Chicago.

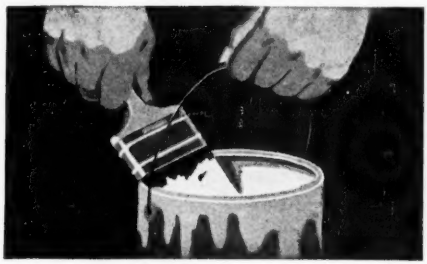
FERMENTATION

Yeast From Industrial Waste Has Low Vitamin Content

Food yeast of the torula-type (*Torulopsis utilis*) has been grown on a number of saccharine industrial waste products. Spent sulphite liquor from paper pulp manufacture has been widely used in the U. S. and in Germany. West Indies and Hawaiian cane molasses is used in Jamaica and California. On a pilot scale, wood sugars from Douglas fir waste, citrus peel juice, and pear cannery waste have been shown to be usable substrates. Yeasts from these sources are much alike in their basic food constituents. Protein (N X 6.25) content ranged from 47.1 to 55.6 percent, crude fat from 3.16 to 5.82 percent. Ash content is closely related to the amount of phosphates fed during propagation of the yeast and varies from 5.56 to 9.80 percent.

Vitamin contents are low compared to yeasts grown on a grain medium. They show some variation from one

from paint



to potato chips!

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Yes, in addition to its economy, simplicity, and efficiency, Dowtherm is safer!

Dowtherm permits the use of a system in which the fire is removed from any flammable material in process. High-temperature operations, formerly possible only under dangerous and costly conditions, are now accurately and safely controlled by this indirect system. Dowtherm presents little hazard in handling, in shipping and storage.

Today Dowtherm users, whether they be paint manufacturers or food processors—or engaged in any other high-temperature operation—enjoy a security unknown in earlier systems. If your operations require precise heating in the 300°—750° F. range, write to Dow for complete information about Dowtherm.

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MIDLAND, MICHIGAN

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type of raw material to another, indicating differential absorption from the media. All were low in thiamin, ranging from 3.4 mcg. per g. for German sulphite liquor yeast, to 13-14 mcg. for yeasts grown on citrus fruit peel juice, or pear cannery waste. Except for thiamin and biotin, the yeast grown on Douglas fir wood sugar solutions had the best vitamin content, with 80.8 mcg. riboflavin, 450 niacin, 134.4 pantothenic acid, and 38.3 pyridoxin per g. Vitamin values of the other yeasts were similar but somewhat lower in amount.

Digest from "Torula Yeast Grown on Spent Sulfite Liquor", by A. J. Wiley, G. A. Dubey, B. F. Laeck and L. P. Huges, *Industrial and Engineering Chemistry*, Vol. 42, No. 9, 1830-33. Sept., 1950.

Yeast Testing Methods Under Comparison

The Berlin or "Punch" method of testing bakers yeast depends upon repeated punch of a standard dough and noting the time for the dough to rise to a predetermined volume. It is an empirical method that depends on the flour used, the amount of sugar in the formula, and the degree of extraction of the flour. It has good reproducibility, using the same yeast and the same flour, but a change in flour can alter the results appreciably. The kind of sugar used also affects the results, though both sucrose and glucose act much the same. Maltose does not affect the results as a rule since the time of the test is not long enough for the yeasts to accustom themselves to fermentation.

In an effort to obtain a more precise method for testing yeasts seven samples from different factories were compared by both the Berlin method and by fermentation of a complete synthetic liquid medium using the volume of CO_2 evolved in a stated time as a measure of fermentative power. Both sets of results were analyzed by variance. The Berlin method distinguished the yeasts successfully, but there was less dispersion of the results, indicating a somewhat reduced sensitivity for the method. A fast yeast could be distinguished from a slow yeast by either method, and both methods gave the same classification to 5 of the yeasts tested. Of the other two, one was classified slow by the Berlin method, even though it gave a rapid fermentation in the liquid medium. The comparison reflects variation in proteolytic activity of yeast on flour and effects of yeast action on the plasticity and extensibility of doughs. Notwithstanding the simplicity of the liquid fermentation methods, the great practical importance of testing in doughs is likely to continue to appeal

to yeast technologists. Both methods should have their place in yeast factories.

Digest from "The Control of French Bakers' Yeasts," by Jean Bure, *Revue des Fermentations et des Industries Alimentaires*, Vol. 5, No. 4, 111-20, 1950.

CEREAL PRODUCTS

Parboiling and Drying Improves Milled Rice

Three end results of a patented process for milling rice are: Less breakage in milling; absence of so-called white bellies in hulled grain, and maximum retention of vitamins in bran and polish. Process includes soaking rice in hot water, parboiling in steam, and drying under controlled conditions. Cleaned rice is placed, to a depth of 4 in. in trays having perforated bottoms. Stacks of such trays are placed in a tank of water at a temperature of 180 F. and kept at that temperature for about 30 min. Then they are transferred, without much loss of heat, to an autoclave into which steam is admitted at such a rate that pressure will rise to 25 psi. in 3-min., producing a temperature of 267 F. Release of pressure is also controlled so that amospheric pressure is reached in 3 min. Trays are then quickly transferred to dryer, temperature of which is preferably 150 F., and held about 1¼ hr. to reduce the moisture content to 22½ percent. Temperature is then lowered to 100 F. for another 1½ hr., to reduce the moisture to 15½ percent. Finally, all heat is discontinued, and air, at atmospheric temperature, is forced over and through rice for 1¼ hr., when rice will be cooled and have a moisture content of 15 percent.

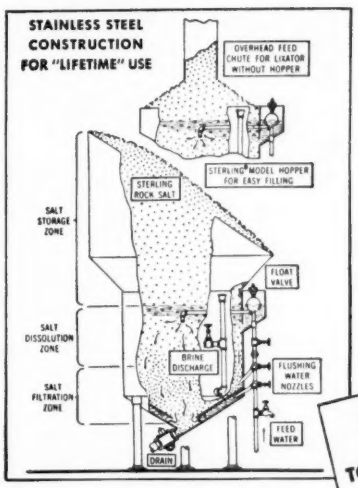
Digest from U. S. Patent 2,515,409, issued July 18, 1950, on an application dated April 16, 1945, to W. W. Jones and G. W. Brewer, Sacramento, Calif., and assigned to Rice Growers Association of California.

DAIRY

Produces Soft Ice Cream

Intended for use at soda fountains and like retail dispensaries, a machine has been patented for reducing scoopfuls of solid ice cream or diced cream to semi-solid consistency so that it may be discharged into a cone or placed on dessert. Construction of the machine is such that it can easily be sterilized, and taken apart and assembled without allowing liquid to come in contact with unsterile surfaces. Rotating tine-like members of machine which break up solid ice cream are of different lengths and disposed at

SALT! WHY HAUL IT? MEASURE IT? STIR IT?



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- ✓ **Automatic salt and water feed to Lixator.**
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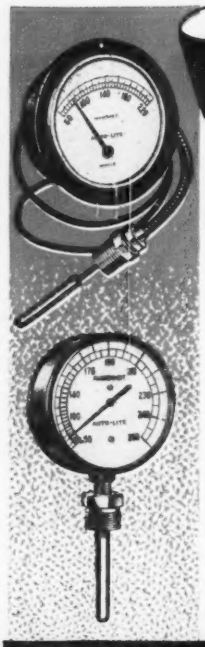

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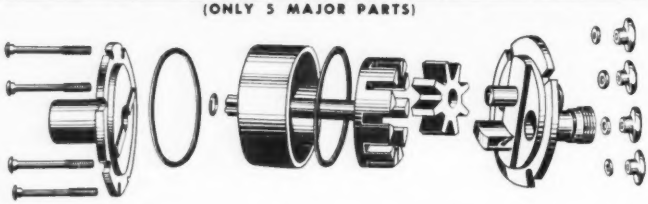

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different angles to each other, resulting in a whipping action that yields a product of uniform soft consistency believed to be superior to products made by cutting blades. Machine is driven by a motor vertically mounted and geared to rotating member in softening chamber.

Digest from U. S. Patent 2,516,895, issued Aug. 1, 1950, on an application dated Aug. 30, 1949, to M. C. Luterick, Montrose, Calif., assigned to Diced Cream of America Co., Los Angeles.

BEVERAGES

Soluble Chocolate Essence

Preparation of a chocolate essence that is substantially free of cocoa butter and, therefore, does not need to be emulsified for use in milk or carbonated beverages is the object of a recently patented process.

In this process, roasted, unground cocoa nibs are treated with a hot, dilute solution of an edible alkaline or acid salt, or organic or inorganic acid. Examples of suitable compounds are: Disodium phosphate; potassium hydrogen tartrate; phosphoric, and lactic acids. Nibs are permitted to brew without additional heating until they swell and the desired flavor and essence constituents are extracted. Resulting mixture is then screened to separate nibs from extract.

Digest from U. S. Patent 2,512,663, issued June 27, 1950, on an application dated Apr. 25, 1947, to B. I. Masurovsky, Bronx, N. Y., assigned to Choco-Essence Inc., New York City.

Improved Soluble Coffee

In an attempt to produce a dried coffee having the desired storability, solubility, flavor, and aroma characteristics, the inventors of a patented process have determined that the qualities of the product are directly related to the pressure under which drying takes place and to the temperature used. Total pressure should be no higher than 10 mm. Hg, and preferably about 1 mm. Increase of pressure above 1 mm. has a readily detectable adverse effect on taste. Temperature of the extract during drying should range between 150-175 F.

The preferred method of extraction is by passing water at 65-75 F. through tubular columns containing ground coffee. From 18-22 percent by weight of the coffee is extracted. Next step is subjecting the extract to a moderate vacuum where it is deaerated before being forced to a vacuum dryer. This is a rectangular sealed chamber, jacketed and heated, within which is located a horizontal belt conveyor of metal and kept at a temperature of

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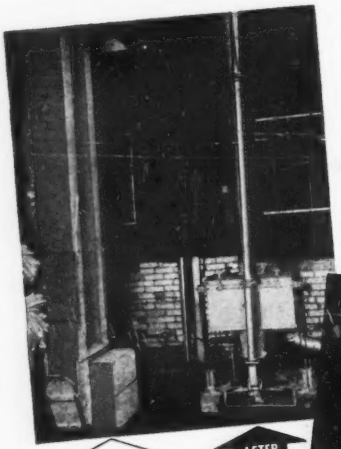

Pneu-Vac Pipeline replaces cumbersome wooden bucket elevator at Megs Macaroni Plant.

FLEXIBILITY of Pneu-Vac installation is illustrated by vertical and horizontal pipes connected with long sweep elbow. Old elevator system is shown in background.

With a flexible, easily installed Pneu-Vac System the Megs Macaroni Company of Harrisburg, Pa. has completely modernized its bulk flour handling . . . stepping up efficiency and assuring the ultimate in sanitation!

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SIZE REDUCTION | MIXING & BLENDING | BULK MATERIALS HANDLING | PRODUCT CLASSIFICATION | PELLETING & CUBING

150-175 F. The coffee extract is sprayed onto the belt so as to form a film 0.002-0.012 in. thick, over the entire surface. As the belt moves between sprockets the dried film is scraped off. Its moisture content should be not more than 4 percent in a time interval of 4-10 min. The dried product is received in an air lock from which it is removed ready for packaging.

Digest from U. S. Patent 2,504,735, issued Apr. 18, 1950, on an application dated Nov. 20, 1947, to H. W. Schwarz, Natick, E. G. Hellier, Medfield, and A. L. Schroeder, Brookline, Mass., assigned to National Research Corp., Cambridge, Mass.

SANITATION

Urban Control of Rats

Considering the rat as "an entrenched and domesticated pest that will continue with us for a long time," an authority on its control offers effective means of reducing the rodent population in various types of urban communities. Cutting off food supply and reducing harborage are the obvious measures to be adopted. Good garbage sanitation alone can control light infestation in residential areas, but more severe means must be used in industrial sections.

Regarding the city block as a rat community, a short-range program of technics is laid down in operational sequence for control on a block-wide scale. These comprise (1) garbage sanitation, (2) area-wide clean-up of harborage, (3) area-wide poisoning, inside and out, (4) rat-stoppage of building exteriors, (5) eradication within buildings, and (6) reinspection and maintenance every 3-6 months. Emphasis is placed on intensive shock attacks with poison because rats adapt themselves to any prolonged attack, tending to avoid many poisons and traps. Depending on the size of the city, these measures can accomplish substantial results in from 2 to 15 yrs.

But any short-range program is inadequate to meet the problem, and must be supplemented with a long-range program comprising rat-resistant construction for all new and remodeled commercial buildings and apartment houses. Types of good construction are illustrated. If building codes required rat-resistant as well as fire-resistant construction, the more attractive rat harborages in cities would be eliminated. Lack of this requirement and of rat conscious inspectors in building departments constitute the commonest basic defects in urban rat control.

Digest from "Urban Rats and Their Control," by J. M. Henderson, *Modern Sanitation*, Vol. 2, 24-28 and 59, July, 1950.

—End

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Truck owners also are pleased with Eaton 2-Speeds by the saving in maintenance costs, faster schedules, lower cost per mile. Your dealer will be glad to explain how Eaton's planetary gearing, positive lubrication and other exclusive features make Eaton axles last longer.

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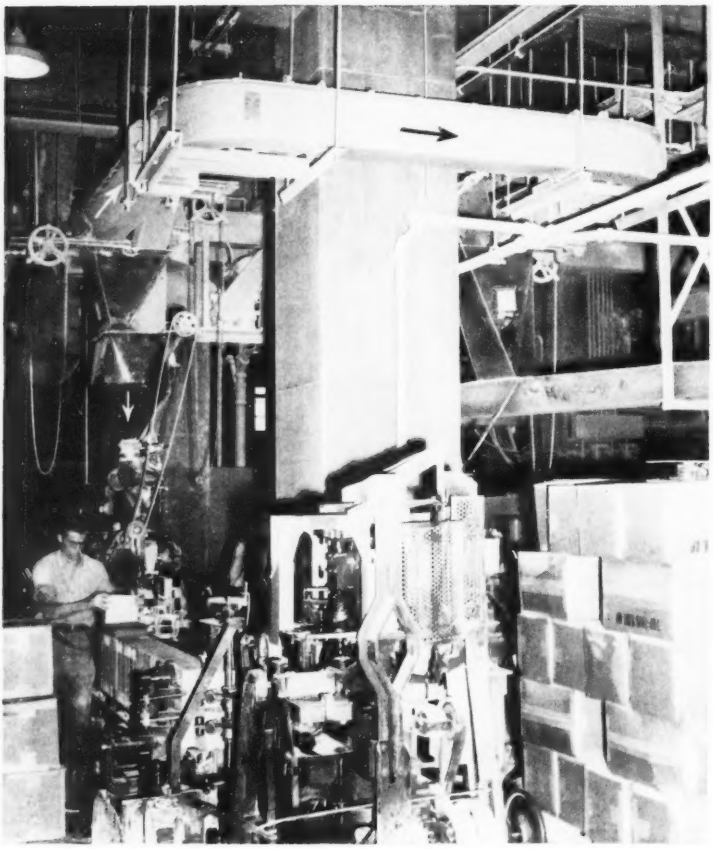

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Because of their dust-tight, sealed casing construction, REDLER Conveyors were the logical choice for this food plant's use. Bulk flour is moved quickly, safely and dust-free—*in ample volume*—from bulk storage to packaging machines. No floor space is required as the horizontal, closed-circuit REDLER Conveyors permit convenient overhead installation for greatest efficiency.

The practical advantages of the REDLER system apply to many other types of plants—particularly where dry powdered and small granular materials must be moved in large volume—rapidly, cleanly and waste-free. Whatever the material you work with, S-A engineers are free to recommend the most suitable type of conveyor . . . Stephens-Adamson makes *all* types of bulk materials handling equipment.

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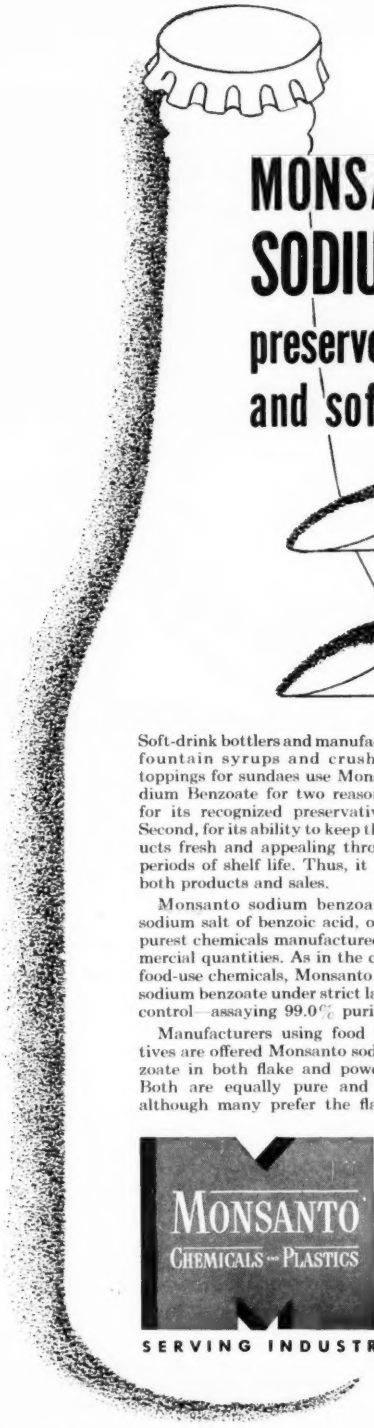
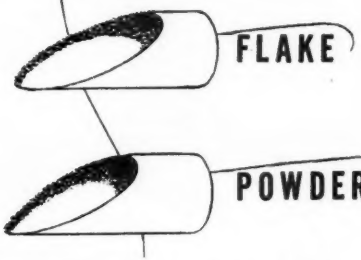
DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT



MONSANTO SODIUM BENZOATE

preserves soft drinks and soft-drink sales



Soft-drink bottlers and manufacturers of fountain syrups and crushed-fruit toppings for sundaes use Monsanto Sodium Benzoate for two reasons: First, for its recognized preservative value; Second, for its ability to keep their products fresh and appealing through long periods of shelf life. Thus, it preserves both products and sales.

Monsanto sodium benzoate is the sodium salt of benzoic acid, one of the purest chemicals manufactured in commercial quantities. As in the case of all food-use chemicals, Monsanto produces sodium benzoate under strict laboratory control—assaying 99.0% purity.

Manufacturers using food preservatives are offered Monsanto sodium benzoate in both flake and powder form. Both are equally pure and uniform, although many prefer the flake form. It is easier to use—is practically dust-free—does not cake or ball—dissolves instantly.

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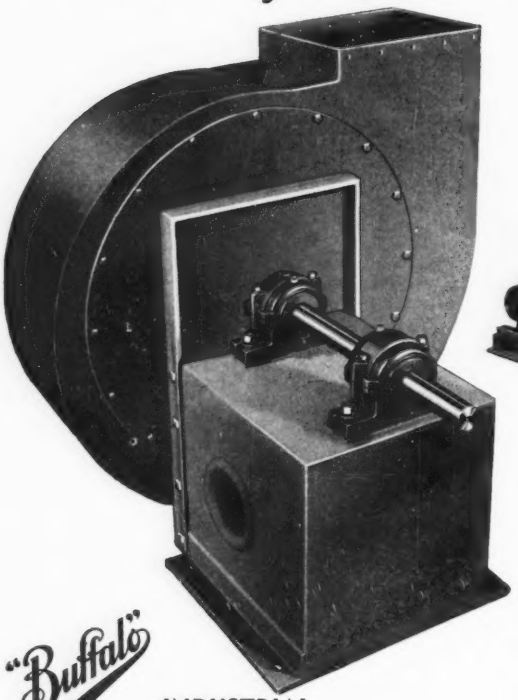

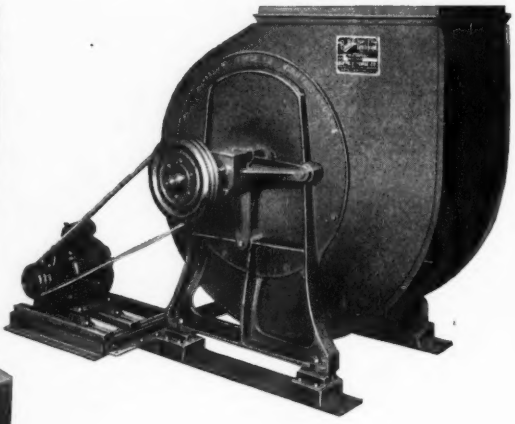

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Food Industry News

Canners' Head Cautions Against Dangers of Overproduction

It is very dangerous to assume that demand for canned foods during the present "not-so-cold war" will be as great as during World War II, in the opinion of Henry P. Taylor, president, National Canners Assn., who discussed the year's outlook at the annual meeting of the Minnesota Canners Assn.

Taylor pointed out that the total pack of corn, peas, tomatoes and green beans was 50 percent higher during the war period than for the years 1936-1940. And the pack of these four items held at 36 percent greater than the prewar years in 1946-49. Civilian use of these items, moreover, was 20 percent greater than prewar during the war years, and 31 percent greater than prewar during the postwar years.

Three million men under arms, Taylor continued, would require an increase of about 6.5 percent in the average annual pack. During the war years the government's demand rose to 30 percent above 1936-1940. "Unless the war gets much hotter," he said, "the requirements of the military may not justify an increase in the pack approximating that of the World War II years."

Population Increases

Looking at the probable increases in civilian demand, the Canners president spotted the 15 percent increase in population during the past ten years as being partially responsible for the 31 percent increase in consumption of the four major canned vegetables. While the birthrate is still high compared with the 30's, he thought that about 1.5 percent increase in annual production would fully cover this factor.

Per capita civilian consumption of the four major canned items has been double the population increase during the past ten years. This has been due in large part to increased buying power. And, the increase during postwar years—when income was high, when there was an adequate supply of these canned vegetables with corresponding low prices, and when competition from durable goods and services was extremely keen—probably represents a proper balance between demand and supply at the prevailing prices. So any increase in civilian demand, aside from population increases, would be due to greater buying power.

But even with increased incomes, buying power is likely to be hemmed in by higher prices and higher taxes on wage earners. Taylor thinks it is safe to say that costs of production of canned foods will advance at least 10 percent in 1951. The present federal budget is already 50 percent greater than government expenditures in 1950. Much of this must come from the pockets of those whose purchases of food reflect immediately changes in their buying power.

"There is every reason to put up adequate packs in 1951," Taylor concluded. "It will be highly dangerous to take foolish, speculative risks."

Gerber Sees Doubling Of Baby Food Sales

The baby foods business, which has shown an increase of more than 1,790% since 1940 may double its present size in the next five years, according to Dan Gerber, president of the Gerber Products Co.

Gerber told Rochester employees that the company's new plant, in West Rochester would be four times the size of the original structure, taken over by purchase from Curtice Brothers a year ago. The new plant, he said would cover 260,000 sq. ft. complete with laboratories, offices, lunchroom, preparation and processing rooms and warehouse.

"This will be one of the most modern plants in the baby foods industry," said Gerber, "although it does not yet match in size the Gerber plants in Oakland, Calif., or Fremont, Mich."

Accident-Free Records Set By Pillsbury

New world records of 2,000,000 work-hours without a lost-time accident were reported recently by two of Pillsbury's largest flour mills—at Buffalo, N. Y., and Springfield, Ill.

The Springfield plant employs an average of 1,350 people and has not had a lost-time accident since Feb. 24, 1950, according to R. J. Kerber, plant manager.

The Buffalo flour mill, with the largest single grinding floor in the world, employs an average of 550 people and has had no lost-time accident since May 12, 1949, W. A. Moore, plant manager, stated.

The last world's safety record in the flour milling industry was broken by Pillsbury's Buffalo plant on April 1, 1950 with 1,150,000 hours free of lost-time accidents.

Report to Stockholders

To bring its American stockholders a little closer, Hawaiian Pineapple Co. brought a scale model of its Honolulu cannery to San Francisco along with the company's annual report. Officials stressed the company's industrial relations program, which requires 20 employees to study the profits statement, then tell complete story to fellow employees. Program has been so successful that the company decided to extend it to its Barron-Gray Division as well as to the Dole Sales Co.

FLORASYNTH

OIL BITTER ALMOND FFPA

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BLACK PEPPER
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Highly concentrated water miscible flavors ready for use "as is"

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Specialties

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* CARAMELLONE
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* Imitation Specialties . . . each superior for its own particular use.

Our Research Department will be glad to help you on your particular problem.

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Food Company $ Sales Keep On Climbing

At least three food companies enjoyed increases in both sales and earnings according to recent financial reports.

Canada Dry Gingerale, Inc. reported sales for the fiscal year of $54,403,983, compared with the previous year's $51,477,000. Net earnings reached $3,178,510 as against $2,183,887.

Langendorf United Bakeries, San Francisco, reported sales of $37,119,200, compared with $35,560,578 a year ago. Earnings were $1,390,439, as against $1,250,949.

H. J. Heinz Co's. sales for six months ending November 1, amounted to $95,295,117, largest for any comparable period in the company's history. Sales for the same 1949 period were $88,444,299. Earnings for the period came to $4,082,009, as against $2,899,924 a year ago.

Sales up and profits down were more prominent in the industry with the reverse being the case in one notable exception—John Morrell & Co.

Swift & Co. sales reached $2,214,000,000, up a mere $1,000,000 from the previous year. Earnings dropped from $26,650,671 in fiscal 1949 to $16,142,586 in 1950.

Clinton Foods, reporting for nine months, showed sales of $77,013,241, compared with $53,091,793 for the same period the year before. Earnings, however, dropped from $3,238,938 in the first nine 1949 months to $2,860,495 for the 1950 period.

Beatrice Foods Co., reporting its third quarter, shows sales of $50,829,395, compared with $48,396,974 in the same 1949 quarter. Consolidated net profit was $875,651, as against $892,065.

And finally, John Morrell & Co. reported fiscal 1950 sales at $291,219,300, compared with $292,795,296 for 1949. Net earnings rose to $860,899 from $84,065. Better margins were largely credited for the greatly improved earnings.

Nix Cramping of Industry On F&DA Amendments

Two considerations, highly important to the food industry, are noted by the Delaney Committee in an interim report on its series of hearings of chemical additives in foods.

"The evidence so far presented," says the report, "appears to indicate that existing federal laws dealing with the use of chemicals in foods are not adequate to protect the public against the addition of unsafe chemicals. It is important, of course," the report continues, "that unnecessary obstacles to technological improvements in food production and processing not be created."

While tentatively agreeing that the Federal Food, Drug & Cosmetic Act should be amended to protect the consumer against the addition of chemicals and synthetics in foods until their safety has been established, the committee concludes that: "In view of the far reaching consequences of such an amendment . . . individuals and groups who would be affected by such legislation should be given further opportunity to present their views and to comment on proposed legislation before any specific recommendations are made to the Congress."

"SO YOU WORK IN THE RIPE TOMATOE DEPARTMENT OF THE CANNERY AND YOU DON'T LIKE YOUR BOSS? NOW WHAT'S THIS IMPULSE YOU WANT NIPPED IN THE BUD?"

Food Industries

Among those not heard in the series concluded in early January, were representatives of the various bureaus of the Department of Agriculture, whose evidence is regarded as highly important by the committee.

The committee plans further investigations of the effects of the use of chemicals in foods on the agricultural economy. Department of Agriculture representatives will be scheduled for the first hearings in 1951.

A draft of a proposed amendment to the Food, Drug & Cosmetic Act was presented to the committee by the Food & Drug Administration. The proposed amendment would require a predetermination of safety by the Food & Drug Administration before a chemical or synthetic could be used in food.

Food Can Restrictions Issued for 3 Months

Long awaited, the tin conservation orders appeared January 27. Three separate orders designated M-24, M-25 and M-26 set limits on tin plate and terne plate for equipment, cans and tin-plate closures, respectively.

M-25, which is of greatest interest to food manufacturers, immediately prohibits the packing of a good many non-food items in tin cans. Coffee, shortening and several other food products must use blackplate, designated CMQ—Can Manufacturers Quality.

Biggest reduction was the cut from 1.50 to 0.25 lb. tin plate for many food items. Beer cans, for which 0.25 lb. tin plate has been used, have been cut to 90 percent of former requirements. There is no reduction in the 1.50 lb. weight for the packing of highly corrosive foods, such as red cherries.

One of the immediate headaches for the canner is the fact that this order is on a quarterly basis. His plans will be complicated because he cannot be sure that another order changing the restrictions will not be out three months after this one was issued. No one knows how long the order will hold. But it is fairly obvious that this is just a starter and that there will come much bigger reductions, or even complete elimination, of tin-can use for some items such as beer, dog foods, and others.

Some canners are concerned about exterior corrosion of 0.25 lb. plate, although tests indicate that it is satisfactory. Because of this concern, however, it is expected that many canners will want double-lacquered ends, and the Quartermaster may want all cans precoated.

Confusion reigns on blackplate supply. Borderizing units used in World

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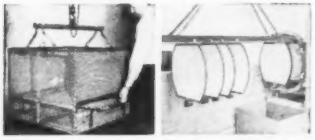

for processing your products or materials, in bulk, through liquids, heat, gases or corrosive agents.

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OFFICES IN PRINCIPAL INDUSTRIAL CITIES

War II have gone out of operation, but there are supplies of chemically treated blackplate from Carnegie-Illinois and Parker. Blackplate, of course, can be lacquered. QMC is said to be satisfied with the tin weights for most of the products. There may be some special requirements, however, which can be met through DO orders. Precoating and procoating will also help to meet Army requirements.

M-24 hits tin plate and terne plate use in such equipment as baking pans for commercial bakers, cheese vats, and dairy equipment. Provisions do not apply to material now in process or inventory, nor when used for special products required by the military.

M-26 permits 1.50 lb. tin-plate closures on all food products preserved in hermetically sealed containers made sterile by heat, except malt and non-alcoholic beverages. Olives, pickles, relishes, sauces, vinegar, french dressing, flavoring extracts, spices, mustard, horseradish and cherries may use 0.75 lb. closures.

All other food products may use 0.50 lb. tin plate closures, except malt and non-alcoholic beverages, which are in the 0.25 lb. closure class.

Wisconsin's Food Laws To Tally With F&DA

Wisconsin's pure food laws, applying to interstate commerce, must agree with Federal food laws, according to a ruling made December 7 by the state's attorney general, Thomas Fairchild. It has been the aim of several groups of women dietitians in Wisconsin to keep state food laws in effect even though they are stricter than those under the Federal Food & Drug Act. Fairchild's decision appears to put an end to the fight.

The state department of agriculture had been asked to rule on enforcement of Wisconsin laws as regards interstate shipment of canned vegetables, in cases where the Wisconsin law prohibited the use of dextrose, starch and other ingredients, which are permitted under the Federal laws.

Britain To Establish Food Tech School

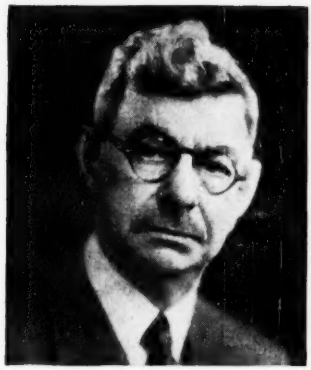
Following negotiations between the Ministry of Education, the Ministry of Food and representatives of various sections of the food industry, it has been decided to establish a National College of Food Technology in London is September, 1951. A board of Governors has recently been appointed by the Minister of Education on the nomination of the interests concerned.

The college will provide the different sections of the food industry with training at a high level. This will include the handling, preservation and processing of meat, fish and other foods together with their various derivatives and by-products. It will also deal with those branches of science most closely concerned with changes which take place in food during preservation and processing. This training will be particularly valuable for food scientists and others employed in the food industry either in manufacturing or research.

As a temporary measure the college will be housed within Smithfield Technical College and some adapted premises in the near vicinity. Plans are being prepared, however, to provide new premises in the near future.

Men to Watch

These four men are going to have a lot to say about defense and production for some time to come. From left: Gen. Lucius Clay, W. H. Harrison, Charles E. Wilson, and Sidney Weinberg. Clay and Weinberg are Wilson's assistants in the overall defense mobilization office; Harrison is new defense production administrator.



FRANK E. GORRELL

The canning industry lost one of its most respected members with the passing of Frank E. Gorrell, in Washington at the age of 83, of pneumonia.

Founding secretary of the National Canners Assn., Mr. Gorrell held that post from 1907 to 1945, when he asked to be relieved. He saw NCA grow from a small organization to one in which its members produce over 70 percent of the entire industry output. He is also remembered for his World War I and II contributions, particularly his plan for set-asides of specified portions of canners' packs for government procurement.

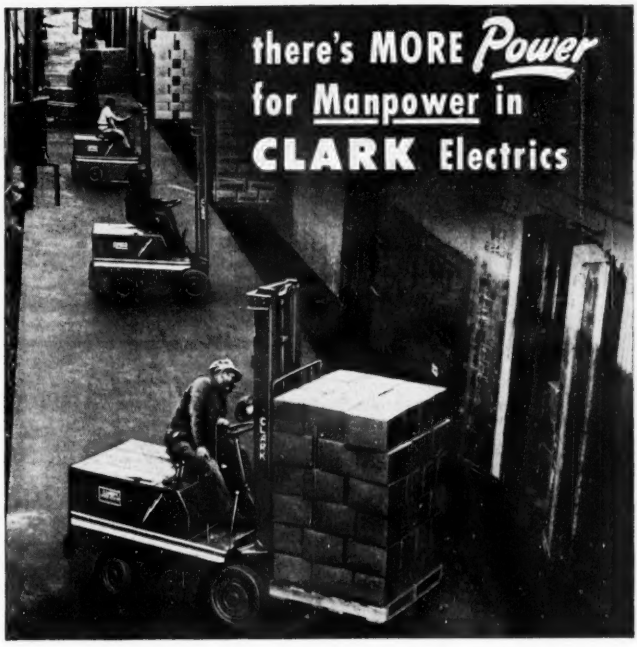
Mr. Gorrell was born in Bel-Air, Md., in 1868. He had a distinguished career as a teacher, editor and publisher before joining in the founding of the canners association.

Hearings On Ice Cream Resumed From 1942

Page 5,798 in the ice cream hearings on standards of identity was begun last month where page 5,797 left off in 1942. As a starter for the resumed hearings F&DA has issued tentative standards based upon the testimony in the previous hearings.

These resumed hearings, which are expected to last several months, ran into a minor snag at the opening session. Government wanted testimony to be presented by ingredients. The industry, on the other hand, wanted its witnesses to tell all they know about ice cream so that they could go home and stay there. Industry was expected to win this one.

There will be, however, 12 subdivisions of hearings involving: Flavors, sweeteners, dairy products, minimum fat and milk solids contents, minimum salts content and relation to acidity, stabilizers and emulsifiers, frozen custard and French ice cream, sherbets, ice cream and related products in all phases, ice milk and related products, ices and miscellaneous.



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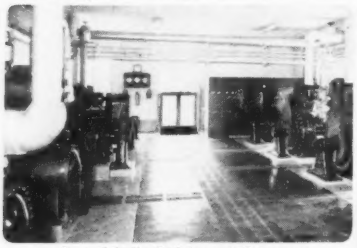
Developed with FRICK Refrigeration

In 1927 the Carthage (Missouri) Ice & Cold Storage Company was operating a 30-ton ice tank.

Today the modernized plant makes 110 tons of ice per day; has a dozen city and country routes, ices railway cars and trucks; rents 2,800 lockers; freezes up to 200,000 pounds of eggs, poultry, strawberries, boysenberries, and packing house products daily; operates 600,000 cubic feet of freezers and coolers. The office is air conditioned.



Some of the Ten Frick Ammonia Compressors at the Carthage Plant

All the cooling loads are carried by ten large Frick refrigerating machines.

Another example of a prosperous COMMUNITY REFRIGERATION CENTER developed with Frick Refrigeration. Does YOUR community have a comparable plant?

DEPENDABLE REFRIGERATION SINCE 1882

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WAYNESBORO, PENNA. U.S.A.

Also Builders of Power Farming and Sawmill Machinery

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PLATE AND FRAME TYPE

1—Simple to clean—easy to maintain.

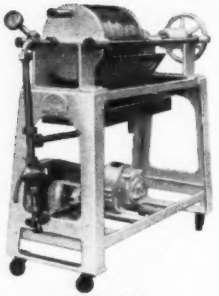
2—A truly Sanitary Filter Press—all surfaces polished, no crevices where bacteria may collect.

3—"Snap-Lock" perforated screens — no screws to hold screens in place, no soldered elements.

4—No gaskets—no contamination, minimum leakage.

5—Any thickness sludge and cake frames.

6—Type #302-#304—or #316 Stainless Steel.



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Proven by use in filtering—hot frying oils, citrus juices, milk and milk products, extracts, vinegar cider, syrups, alcoholic and non-alcoholic beverages.

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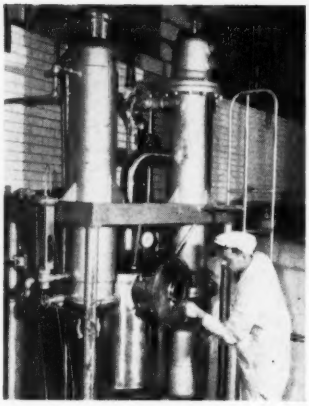


Concentrating Milk

In order to carry out its pilot plant operations on concentrated milk, Borden's has installed this machine at its Chicago division plant. Seen here with the machine is Richard Marren, general foreman, Hamilton Park plant.

Borden is Pilot Testing Concentrated Milk

Borden Company has begun pilot plant operations in Chicago for the concentration of liquid milk at low temperatures under high vacuum.

Development of the process to the pilot plant stage is the result of more than two years of laboratory work on the product and the building of a specially designed evaporator by Mojonnier Bros. Co., Chicago.

No decision has yet been made as to whether this concentrated milk will be marketed in liquid or frozen form, how it is to be packaged, or to the extent of concentration. The objective is to obtain a concentrate that can be reconstituted into whole liquid milk by the addition of water without change in flavor or other qualities of the milk from which the concentrate is made.

Results of the pilot plant test runs are being checked with Federal and Chicago health officials. The initial runs indicate need for further research studies on ways and means of retaining the flavor of fresh milk.

Frozen Concentrated Milk Goes Into Production

Gould Milk Corp., of Minnesota, is to be the first company in the U. S. to use the new frozen milk concentrate process developed by Dr. Arthur L. Stahl, University of Miami, the originator of the frozen citrus juice concentrate process.

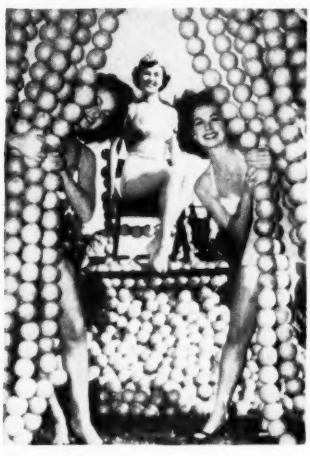
The patent for this process is held by the Milk Concentrate Corp, Coral Gables, Fla., subsidiary of Industries Unlimited, Inc., Miami. Russell Edwards is president of both companies.

The frozen milk concentrate is a four-to-one product. Three fourths of the volume is removed from the fresh milk, leaving the solids and some moisture, which is frozen by a process similar to that used for frozen citrus juices. Samples open after eight months are said to have been in perfect condition, and it is believed that the milk will remain in good condition even longer than that.

The Gould Milk Corp. was planning to have its new product on the market within a matter of weeks.

Salmon Cannery Wages

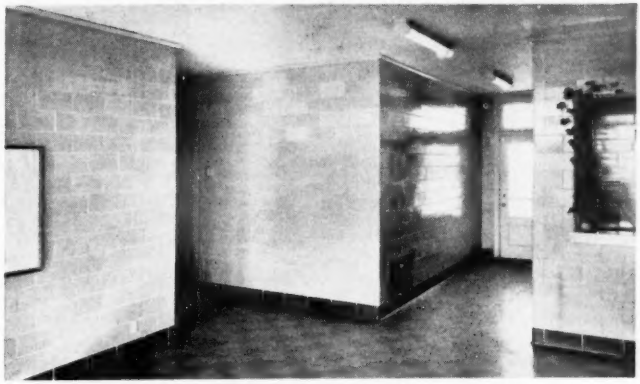
Non-resident workers in Alaska salmon canneries are granted wage increases of 12.5 percent over 1950 pay scales in a contract between the Alaska Salmon Industry, Inc, with headquarters at Seattle, and Local 77 of the Packing House Workers Union, CIO. Base pay for some 2,500 workers thus is increased to about $265 a month, with board, room and transportation provided. A two-month guarantee is included, according to W. C. Arnold, managing director of the Alaska Salmon Industry.



Real Oranges

To tell the truth, those Floridans make it a little difficult to ignore the oranges in this publicity bit, done for the Orange Bowl festivities. Natcherlly, the one in the middle—girl, that is—is the Queen and the curtain puller-backers, princesses. (Wide World)

Lobby walls of KRAFTILE at the Aluminum Co. of America offices (Reconstruction Finance Corporation plant) Riverbank, California



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1. Never requires painting
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You can get it with KRAFTILE glazed industrial wall units. In fact, you solve two problems at once—selection of the structural wall material and of the finish—when you specify KRAFTILE.

These glazed "building blocks" are serving Western business and industry in washrooms, laboratories, processing rooms, corridors and offices.

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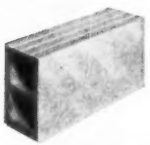

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★ **ONE-CRAFT INSTALLATION**—when the mason lays it up, the wall's *finished*—no lathing, plastering, painting!

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( ) ***Send my copy of your "Graphic Standards for Glazed Tile"***

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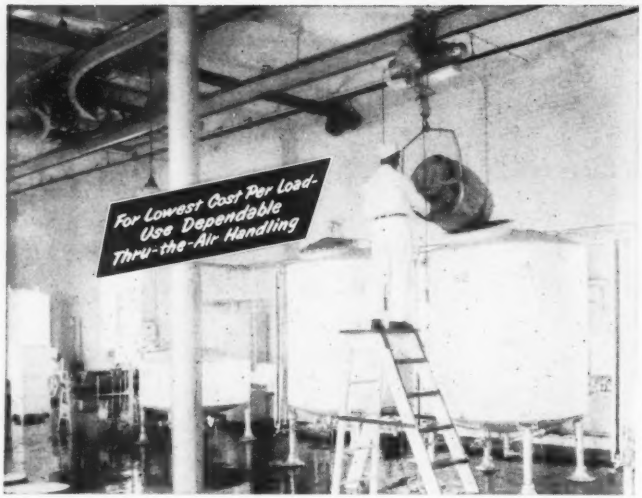

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Be sure you get the hoist installation best qualified to do *your* job. It's wise—and costs you nothing—to get the facts first, rather than to make expensive changes later.

May we place our experience of a great many years of successfully designing all types of hoist installations at your disposal?

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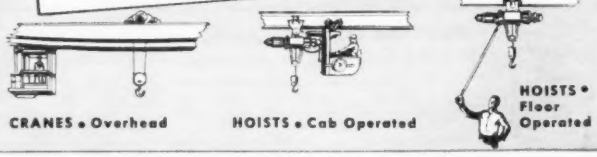

422 SCHUYLER AVENUE • MONTOUR FALLS, N. Y.

Gotta Get Bigger Cans

What Otto Scheu, Pittsburgh amateur botanist, calls a prehistoric bean was grown in his gardens from a seed sent to him from Egypt. The young lady looks as though she had been asked to eat the thing. (Wide World)

Butter Institute Forms Mobilization Group

O. E. Droege, president, American Butter Institute, has appointed a Defense Mobilization Committee for 1951 consisting of: Chairman: A. F. Perrin, Cudahy Packing Co., Omaha, Neb. Members: D. K. Howe, Fairmont Foods Co., Omaha, Neb; E. E. Haskell, Beatrice Foods Co., Chicago; G. C. Mahle, Sugar Creek Creamery Co., Danville, Ill; G. W. McLatchey, American Dairies, Inc., Kansas City, Mo; and Clarence Neilsen, Wapsie Valley Creamery Co., Independence, Iowa.

This committee is to provide essential information to Federal defense agencies and will represent the entire butter industry's interests during the period of defense mobilization. First meeting of the committee was held on December 27 in Omaha, Neb.

The Institute has filed an appeal with the Container Div. National Production Authority, seeking continuance of supplies of laminated aluminum foil for wrapping butter.

Makers of butter have been requested to inform NPA that: (1) No substitute can be obtained for the laminated aluminum foil wrapping on butter to protect its quality by preventing absorption of light and other food flavors; (2) problems will be met in securing adequate supplies of butter wraps and cartons should aluminum foil wraps be restricted; and (3) this restriction will hamper the ability of butter-making companies to handle receipts of cream from pro-

ducers and to maintain general employment of company personnel.

The Institute reports that CCC stocks of 1949 butter have been reduced to about 5,000,000 lb. with the fulfilment of present commitments and that CCC stocks of 1950 butter are also dwindling rapidly. Distribution to foreign relief agencies is to be cancelled soon. All requests for domestic relief agencies are to be screened carefully. Sale of government held cheese to the domestic trade has been stopped.

Curtice Buys Cannery In Buffalo Area

Curtice Brothers has purchased the Fuller Canneries Co. plant at South Dayton, N. Y., west of Buffalo.

Curtice had been seeking a new canning plant since it sold the factory on Buffalo Road in Rochester earlier this year to Gerber Products Co.

The Fuller plant, one of the largest and most modern in the state, is equipped for canning peas and green and wax beans, and will provide for greatly increased production, Curtice officials said. They also plan to move part of their tomato operations there, including manufacture of Blue Label Ketchup.

Curtice general offices will remain in Rochester, directing operations of canning plants in Bergen and Mt. Morris, and a freezing plant in Brockport, as well as the new South Dayton factory.

Distributor For Nestle Adopts Company Name

Lamont, Corliss & Co., New York, changed its name to Nestle's Chocolate Co., Inc. on January 1.

"This change in name," said President Clive C. Day, "identifies the company definitely with the quality chocolate products it has distributed for a number of years. The company formerly represented a number of different manufacturers as sales agents. Its activities are now confined exclusively to the distribution of Nestle's products and it was felt the company should be more closely identified by name with the products themselves.

"The manufacture of Nestle's will continue in the large Fulton, N. Y. plant where a substantial addition of production facilities was to be completed about the first of the year."

Day also pointed out that the Nestle's Chocolate Co. is a member of the world-wide Nestle organization with 125 factories located in all the principal countries of the world.

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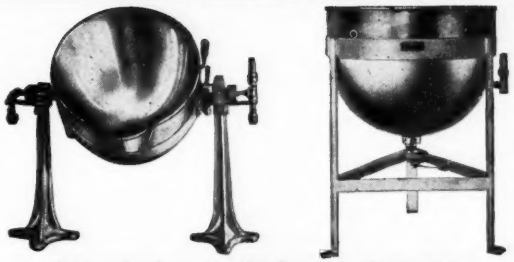
LEE Kettles

WHERE CORROSION-RESISTANT EQUIPMENT IS NEEDED



Descriptive Bulletins on Request

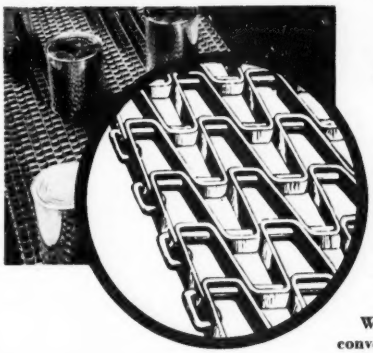
LEE METAL PRODUCTS CO. INC.

416 PINE STREET . . . PHILIPSBURG, PA.

ALL LEE KETTLES ARE MADE TO A.S.M.E. CODE

You *Save* on Food Processing Costs with

LA PORTE *Flexible* STEEL CONVEYOR BELTING



- "Right" for EVERY Process
- Requires Less Maintenance—whatever the process

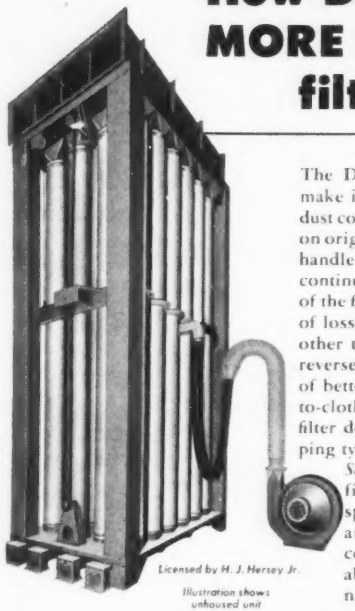
Whether you use this rugged conveyor belting for freezing, canning, dehydrating, on sorting tables, in washers or cookers—or for any other food manufacturing process—it will give you faster, more efficient service from bin to shipper. La Porte Flexible Steel Conveyor Belting retains its shape . . . will not creep, weave nor jump. Easily cleaned with steam or hot water. Requires little care to give extra years of dependable, trouble-free performance.

Available in any length and practically every width. Write your dealer TODAY for literature and prices.

LA PORTE MAT & MFG. CO.

BOX 124 LA PORTE, INDIANA

How DAY gives you MORE for your dust filter dollar



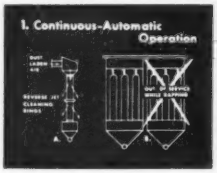
Licensed by H. J. Hersey Jr.

Illustration shows unhoused unit

The DAY Type "AC" Dust Filter helps make important savings two ways in your dust control program. *First:* you save money on original cost because you buy *less* filter to handle *equal* volumes of air. With DAY's continuous-automatic operation, only 1¼% of the filter cloth is lost for cleaning instead of losses up to 50% which occur in most other types of filters. Also, DAY's gentle, reverse air-jet cleaning action permits use of better filtering fabrics for a greater air-to-cloth ratio. Thus *less* cloth and a *smaller* filter do the same job as much larger rapping type units.

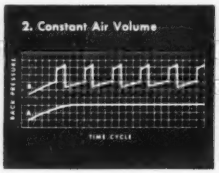
Second: economy stems from the DAY filter's compact design. Less floor space is needed and installation costs are minimized. Its simple, rugged construction gives years of dependable service at rock-bottom maintenance costs . . . economy all the way.

THESE ADVANTAGES MAKE THE DIFFERENCE



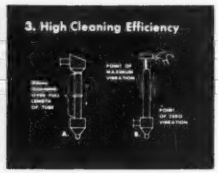
A. Reverse air-jet cleaning rings travel up and down the tubes of a DAY filter, constantly cleaning the cloth.

B. Most other types of filters must shut off a complete section for cleaning or rapping. This may amount to 50% of the cloth area.



A. Back pressure rises slightly when the DAY filter is first started, then levels off and remains uniform. This assures the constant air volumes necessary for efficient dust collection.

B. Sharp back pressure and air volume variations occur in rapping type filters when sections are shut down for cleaning.



A. The DAY reverse air-jet cleaning mechanism is gentle yet positive, cleaning each tube uniformly and permitting the use of high efficiency felt filtering cloth.

B. Tougher cloth with resultant poorer filtering must be used in rapping type filters. Cleaning effectiveness varies widely from point of vibration to where cloth is attached to filter.

Other Important Advantages

Separated Dust Streams — One DAY Type "AC" Dust Filter can handle several different product streams simultaneously without mixing . . . thus doing the work of several individual units.

No Dust-Catching Ledges—DAY filters have no flat surfaces or ledges where dust can collect and become contaminated . . . no places to encourage infestation.

GET THE COMPLETE STORY

Write-to-DAY for Bulletin 491

DAY SINCE 1881

The **DAY** *Company*

817 3rd Ave. N. E., Minneapolis 13, Minn.

IN CANADA: P. O. BOX 700, FORT WILLIAM, ONTARIO

BRANCH PLANTS IN FT. WORTH, BUFFALO AND WELLAND, ONTARIO

New Meat Order Permits Imports from Mexico

Certain meats and meat food products are now permitted entry into the United States from Mexico. Secretary of Agriculture Charles F. Brannan has issued an amendment to section 27.2b of the Federal Meat Inspection Regulations, effective Dec. 30, 1950, which adds Mexico to the list of those countries from which certain meats, including canned and cooked meats and meat food products, may be imported into the United States.

The amendment means that the meat inspection system recently established in Mexico has been recognized as the substantial equivalent of the system now in operation in the United States. The amendment however, does not have any effect on the present restrictions that prohibit entry of fresh, chilled, or frozen meats from Mexico. This restriction is applied to all countries in which the contagious foot-and-mouth disease is known to exist.

The addition of Mexico makes a total of 30 countries from which meats and meat food products are eligible for importation.

Fruit Juice Storage Studied at Geneva

How storage temperatures ranging from zero to 70 deg. F. affect flavor, color, and vitamin C content of fruit juices and fruit juice concentrates has been under investigation at the Experiment Station at Geneva.

Both raw and pasteurized juices and concentrates of apples, strawberries, red, purple, and black raspberries, cherries, rhubarb, and plums were used in the studies. Vitamin C, or ascorbic acid, was added to samples of each juice to "fortify" the product and to note the relation of vitamin C content to changes in color and flavor. Details of the studies are reported in a bulletin just published by the Station.

The flavor of all pasteurized juices and concentrates changed during storage at 70 deg. F. Strawberry juice changed in flavor at temperatures as low as 34 deg. F. The addition of vitamin C did not noticeably prevent or retard loss of flavor in any of the pasteurized juices.

Raw apple juice highly fortified with vitamin C retained the characteristic fresh fruit flavor. Unfortified raw apple juice, on the other hand, developed a varying degree of musty flavor even when stored at zero or at 18 deg. F.

Pasteurized juices of cherry, prune, purple raspberry, the Latham red

They Hold Groceries, Too

Possibly to make carrying grocery packages a little more interesting for the small fry, the Fenton Co., of New York, has fashioned these paper bags, now being introduced to central Illinois shoppers. But the advertisement is for mom.

raspberry, and apple had somewhat better flavor than the corresponding raw juices.

Adding vitamin C to apple juice slowed down the development of brown color in the juice. It also retarded development of brown color in strawberry juice, but it hastened the destruction of the red color of the juice.

USDA Cheese Standards Are Now In Effect

The Department of Agriculture has issued official standards for grades of cheddar cheese, replacing the tentative standards in effect since 1943.

The standards, which went into effect January 2, are based on: (1) Flavor and odor, (2) body and texture, (3) color, and (4) finish and appearance. They establish the following grades: U. S. Grade AA; U. S. Grade A; U. S. Grade B; and U. S. Grade C. The standards contain specifications for grading cheese of three different ages: Fresh or current make, medium cured, and cured or aged.

The official standards just announced are not greatly changed from the tentative standards which have been under trial for about eight years, Department officials stated. One revision is the inclusion in the standards of rindless (cured-in-package) cheese. Further revision has raised the quality specifications slightly for all grades of cheese by further limiting the permissable defects for each grade.

As in the case of the tentative

Here's what
IN-PLANT CHLORINATION *can do*

"Member of National Canners Association"

BAKER CANNING COMPANY

Theresa, Wisconsin

April 4, 1949

PACKERS OF NUMBER 10 TINS
Wisconsin Quality
Peas
Whole Kernel Corn
Address all Communications to Theresa, Wisconsin

Wallace & Tiernan Co., Inc.
Newark 1, New Jersey

Gentlemen:

We have been using In-Plant Chlorination for a few years, and feel that this piece of equipment is just as important in a canning factory as any other piece of equipment used in the processing of canned foods.

The first year we installed In-Plant Chlorination we had chemists make bacteria counts, and checks at approximately fourteen points throughout the plant, such as picking table belts, flume systems, washers, blanchers, fillers, closing machines etc. In making these tests we did not use In-Plant Chlorination for one week, and the next week we used In-Plant Chlorination in order to make comparisons as to bacteria count.

The reduction in bacteria count, between the two operations is almost unbelieveable. We found that by using this equipment properly, and increasing the dosage at clean-up time, we eliminated bacteria at many of the check points. One cannot, however, install In-Plant Chlorination and forget about a good housekeeping job. This would be an error, indeed.

However, by having In-Plant Chlorination, and doing a good job of house-cleaning, one can eliminate the building up of bacteria in most any piece of equipment. We do find that by using In-Plant Chlorination the clean-up time necessary at clean-up periods is practically cut in half.

You may use this letter in part or in full - for any purpose you care to.

Yours very truly,

BAKER CANNING COMPANY

By Robert Baker

RDB:eal

In-Plant Chlorination, engineered by Wallace & Tiernan, can help your plant, too. Bacterial counts are reduced, odors controlled, and on-the-line time for processing equipment increased when you use this proven method.

Call your nearest W & T Representative now for complete information.

Other services by Wallace & Tiernan Associated Companies include Merchen Feeders for precision blending BY WEIGHT; Richmond Sifters for all separating problems involving powdered or ground materials; and Richmond Permaflux Magnets for the complete elimination of any ferro-metallic contamination of your food line.

WALLACE & TIERNAN COMPANY, INC.
CHLORINE AND CHEMICAL CONTROL EQUIPMENT
NEWARK 1, NEW JERSEY • REPRESENTED IN PRINCIPAL CITIES

1-33

Why so Many Products are Handled by EXACT WEIGHT...

EXACT WEIGHT Scales checkweighing hand or machine wrapped meat products. John J. Felin, Philadelphia, Penna.

Thousands upon thousands of products go across EXACT WEIGHT Scales today. Why? The facts are that every scale we build fits the operation as to type of product . . . planned production line layout . . . weight capacity of the product handled . . . tolerance, over and underweight . . . speed of operation, whether the work is done by hand, semi-automatic or fully automatic weighing . . . working conditions under which the product is handled, such as wet or dry packaging. All this has given us countless experiences in many industries and with many, many products. The result has been that old users buy this sound equipment again and again . . . new users are added daily. Both have found that EXACT WEIGHT Scales generally do their particular task faster, with less waste and at less cost than any other like equipment. Write us about your handling problem.

EXACT WEIGHT SCALES
Industrial Precision
THE EXACT WEIGHT SCALE COMPANY
910 W. Fifth Ave., Columbus 8, Ohio
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• IN FOOD PROCESSING
When You Use Low Temperature
USE CORK

The time to make sure of your insulation protection is before you build or expand. Get the facts on Cork insulation when they can do the most good. Cork is so efficient in insulating properties that its performance has long been the accepted standard for low temperature requirements. Its wide usage in the refrigeration industry is due to its proved record for more than 40 years. Mundet refrigeration engineers are experienced in all details of temperature control. Write to us now for recommendations and estimates . . . let us help you secure the most profitable use of low temperature. Mundet Cork Corporation, Insulation Division, 7101 Tonnelle Ave., North Bergen, N. J.

MUNDET
CORK INSULATION

Potato Chips

There is some room for conjecture here as to just what this picture is supposed to convey. Caption says the gal is another queen getting ready to queen over the January convention of the National Potato Chip Institute. Could be! (Wide World)

standards, the official standards will be used by the Department in connection with its voluntary inspection and grading service and its purchases and sales of cheese under food procurement or price support programs. The standards also will be available to the cheese industry for use in buying and selling cheese on a quality basis.

Salmon Pack Is Smaller But Higher Valued

The 1950 Alaska salmon pack, although smaller than last year's, is worth about $2,000,000 more, according to the annual estimate of E. B. McGovern, salmon broker of Seattle. It is estimated to total 3,235,828 cases of 48 No. 1 cans, valued at $82,192,422.

The 1949 pack of 4,375,000 cases brought an estimated $80,102,000.

Seeking to restore important salmon runs, the Washington state legislature has been asked by the Washington State Department of Fisheries to approve a $4,633,000 budget to cover the department's operation for the next two years, an increase of $2,825,000 from the 1949-50 biennium.

The department proposes to increase the present 163 fish rearing ponds by 60 percent and to increase the patrol force from 20 to 33 persons. Minor funds are proposed for the construction of fishways and stream clearance work. A total of $595,573 is proposed for research, including a new shellfish laboratory.

8 Million Tons of Sugar Seen To Be Adequate

USDA's setting of U. S. sugar quota at 8,000,000 tons is viewed as providing enough sugar for all uses under current conditions. It is only a 2 percent increase over the 1950 estimated consumption of 7,850,000 tons.

But reserves are estimated at about 600,000 tons—larger than last year.

Of the 8,000,000 tons, beet sugar producers will be allowed to market 1,800,000 tons and mainland cane sugar producers 500,000 tons.

There is a feeling that the quota should have been raised a little more in view of the unpredictable future.

On the other hand, spokesmen for the Puerto Rican Sugar Producers Assn. fear prices will soften in the spring as a result of the high consumption estimates. A Hawaiian Sugar Planters Assn. spokesman said he hopes the Department of Agriculture is right in feeling the estimate will aid in "stabilizing prices."

Pacific Fisheries Urge Japanese Fishing Ban

Japanese fisherman should not be allowed again to fish in North American waters, the Pacific Fisheries Conference agreed in Seattle, and urged the state department to include such a proviso in the proposed Japanese peace treaty.

"Gen. Douglas MacArthur has permitted the Japanese to fish in their accustomed fishing grounds," said Conference Chairman Miller Freeman, "but has not allowed them to go east of the 18th meridian or north of the 45th parallel. The state department has indicated that it will abandon these limitations when the peace treaty is concluded."

The conference consists of representatives of labor unions, vessel owners and operators from Alaska to the Mexican border and Hawaii.

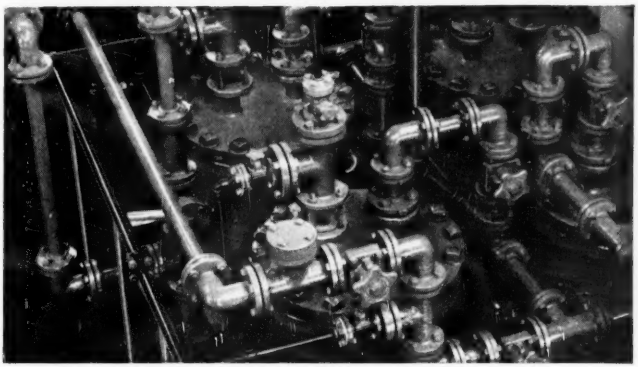
Residue Tolerance Rules Expected by 1952

Regulations resulting from Food & Drug Administration's hearing on residue tolerances will "probably be applicable to the 1952 growing season." This was stated by presiding officer B. D. Levinson at a meeting of entomologists in Denver late in December.

Necessity for use of pesticides will be based largely on official recommendations of state and federal agencies. When materials are still in the experimental stage, necessity for use will

specify SARAN LINED steel pipe

CORROSION PREVENTION IS MORE PROFITABLE THAN EQUIPMENT REPLACEMENT!



WHAT part of industry's six billion dollar corrosion bill are you paying? Any amount is too much and can be cut considerably through the installation of saran lined steel pipe. You will find, as have many of the country's leading manufacturers, that saran lined steel pipe means dependable, long term operation. In addition to the excellent corrosion resistance of this remarkable pipe—you have the plus values of rigidity, pressure strength and ease of installation, requiring NO special tools. These advantages are all important to you in the reduction of shut-down time, lost production and equipment replacement.

Send in the convenient coupon to The Saran Lined Pipe Company, Dept. MTSP-5011, for more detailed information on saran lined pipe.

★send today!

Please send me a copy of your catalog on Saran Lined Pipe, Valves and Fittings.

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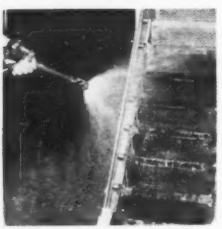
SARAN LINED PIPE a DOW product

3 ways to Increase Production

Steam-cleaning juice extractors cuts hours off cleaning time

1 **Equipment cleaning:** Oakite Steam-Detergent Gun hits soils three ways at once—with heat, force, powerful detergent action. Gun cleans and rinses at the twist of a valve; penetrates even hard-to-reach areas and up to 12 feet above working level. Tops for getting blanchers, conveyor belts, heavy equipment *back in service faster.*



Spraying potent Oakite germicide reduces spoilage

2 **Reduce spoilage through effective bacteria control:** Oakite Bactericide releases *more* active form of available chlorine to kill more bacteria *faster.* Oakite Sanitizer No. 1—quaternary ammonium compound—prevents recontamination for relatively long periods. Controls slime and algae, too. Excellent for treating recirculated water and water in wine-holding vats between seasons.

Photographs of water pipe before and after it had been descaled with Oakite Compound No. 32.

3 **Top Equipment Performance:** Descale circulating units and heat exchangers with Oakite Compound No. 32, acidic material inhibited against attack on metal surfaces. Quickly, thoroughly dissolves hard water scale, lime deposits, rust. No rodding or drilling out—no dismantling.

FREE Booklet F7709 tells all about these . . . other Oakite ways to speed cleaning, step up production. Write for your copy today!

OAKITE PRODUCTS, INC., 26G Thames St., NEW YORK 6, N. Y.
Technical Service Representatives in Principal Cities of U. S. & Canada

OAKITE

TRADE MARK REG. U. S. PAT. OFF.

SPECIALIZED INDUSTRIAL CLEANING MATERIALS • METHODS • SERVICE

usually be regarded as "not yet established." Intermediate are materials which may be "borderline" cases, and it is these which will require the most careful study of the record.

Toxicity determinations are anticipated by Levinson to be more easily answered. However, interpretations of animal tests, determination of adequate safety factors, and other points relating to toxicity and pharmacology are regarded as "of utmost importance."

Quaker Oats Takes Over Coast Fish Plant

Quaker Oats Co., Chicago, has entered the fish canning and cat food businesses by purchase of Coast Fishing Co., Wilmington, Calif. The purchase was for cash reported to be in excess of $4,000,000.

Coast Fishing Co. cans tuna fish, sardines and mackerel, in addition to cat food, and will operate as a separate unit of Quaker Oats Co.

Present management and personnel including merchandising channels and brokers will be retained. Company has plants at Wilmington, Calif., and Lubec, Me.

Purchase of Coast Fishing Co. brings the number of Quaker Oats Co. plants to 19 and is the fourth new addition to Quaker Oats Co. holdings this year. Others include leasing of a dog food plant in Ogden, Utah, and the building of a chemical plant in Omaha, Neb., and a corn mill and pancake flour plant in Chattanooga, Tenn.

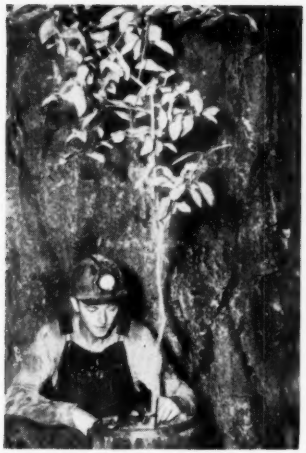
Cacao Production

World production of cacao beans in 1950–1951 is forecast at 1,687,000,000 lb., only a little lower than last year's record 1,704,000,000 lb., and about 7 percent above the average of the immediate prewar years. All but a relatively small quantity of the cacao crop is available for export since consumption in most producing countries is very low.

Bakery Sanitation

To provide bakers with a method of cooperative effort in solving individual plant problems in sanitation, an additional service is to be offered in 1951 by the Department of Bakery Sanitation of the American Institute of Baking as part of the Bakery Inspection program.

The new service stresses the formation of sanitation committees within each individual plant to be made up



Underground Lemons

It took 12 years for this pampered lemon tree to grow to its present height, on account of its doing the growing in an Idaho lead-silver mine, 4,000 ft. under ground. It needs the vitamins this miner is supplying because they tried to move it to a healthier spot recently and it almost died before its nurses got it back home. (Wide World)

of key plant executives. Function of these committees will be to hold short weekly meetings, in which a coordinated effort is to be made to solve existing sanitation problems and thus further the effectiveness of the plant's overall sanitation program. The role of the AIB service program will be to assist in forming the committees and to advise and supervise, if requested, suitable procedures that can be followed in carrying out the purpose of the meetings.

Packaged Meat Sales

The Seattle, Wash., City Council has approved an ordinance which permits the sale of prepackaged fresh meat from self-service refrigerated cabinets in licensed meat shops, with the requirement that the meat be cut and wrapped on the premises where it is to be sold. Sales of prepackaged meats were banned under ordinances previously in effect.

Food Wage Minimums

The federal government is setting minimum wages which employers will have to observe on government contracts in three branches of the food industry—confectionery, flour and cer-

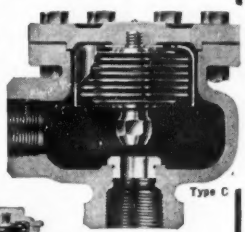
New York manufacturer
culls candy cripples
●Undersized or misshapen pieces of candy called "cripples" fall through the mesh of this Cyclone spiral conveyor belt. Only properly-sized and perfectly-shaped candies remain on the belt to be carried to the packing tables. All manual sorting of candy is eliminated—reducing both time and cost of production.
Whatever size candy you may produce there is a Cyclone belt of the right gauge to fit your operation. (Illustration shows four actual mesh sizes.) And other Cyclone belts—Cham Link, Flat Wire and Flex-Grid—are available for all types of food plant conveyor problems. For more examples and information write for our free catalog No. 4.
CYCLONE FENCE DIVISION
(American Steel & Wire Company)
DEPT. H-21, WAUKEGAN, ILL.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK
USS
CYCLONE
METAL CONVEYOR BELTS
UNITED STATES STEEL

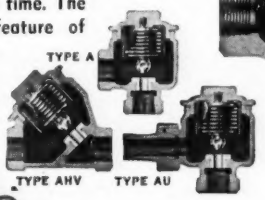
Nicholson Makes

Freeze-Proof Steam Traps

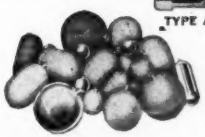
for Every Plant Use

Because they drain completely when cold, these four types of Nicholson steam traps are positively freeze-proof. Can be freely installed outdoors. Universally recommended for use in lines which need not be in continuous use during cold weather, because they are freeze-proof and because their 2 to 6 times average drainage capacity results in minimum heat-up time. The non-air-binding feature of Nicholson traps also notably facilitates steam transfer in severe weather.





Four types: size 1/4" to 2"; press. to 225 lbs. BULLETIN 450.



HIGH-PRESSURE FLOATS—Stainless, monel, steel or plated steel. Welded. In all sizes and shapes; for operating mechanisms and as tanks or vessels. 2-day delivery. BULLETIN 650.

W. H. NICHOLSON & CO., 193 Oregon St., Wilkes-Barre, Pa.

get the TRIPLE VALUE
BUFFALO Conveyor BELTS
they're
MADE TOUGHER
Buffalo pays the top dollar, everywhere, to get the strongest, sturdiest cotton yarn available. Belts are carefully checked for tensile strength on this special tester and must meet a minimum strength specification of 225 lbs. per inch, per ply. Better yarn is the backbone of the conveyor belts made by our WOV-IN-WEAR PROCESS.
they're
WOVEN TIGHTER
WOV-IN-WEAR is a unique belt weaving process that is our own EXCLUSIVE development. From more than 50 years experience, we have learned how to weave under HIGHER TENSION and the end result was this NEW kind of loom and a BETTER, TIGHTER WEAVE.
they
LAST LONGER
Tougher yarn and tighter weaving is a combination you can't beat in the belt business. For instance, Buffalo's famous PLAS-TEX belt for bakeries and special food handling operations, lasts longer because of the extra strong woven belt underneath the plastic cover.
★ OVER 200 SIZES
★ 35 WIDTHS
★ 7 THICKNESSES
BUFFALO WEAVING & BELTING COMPANY
209 CHANDLER STREET
BUFFALO 7, NEW YORK
NEW YORK PHILADELPHIA CHICAGO DETROIT SAN FRANCISCO

eal preparations, and sugar refining.

Under the Walsh-Healey Public Contracts Act, the Secretary of Labor determines the prevailing minimum wages that must be paid for work on government contracts of more than $10,000.

The Wage-Hour office was to hold hearings January 30 for the flour and cereal industry. Preliminary discussions have been held for confectionery and sugar refining. Hearings will follow.

Minimum wage rates have never been set for these three industries, although they apply in 42 others.

Illinois Tech Offers Food Sanitation

Illinois Institute of Technology will offer a 15-week course in sanitary food handling beginning Feb. 12, it was announced recently by Milton Parker, director of food engineering.

The course is sponsored by the Chicago section of the Institute of Food Technologists in cooperation with Illinois Tech. It is to be directed by Ellery H. Harvey, professor of food engineering.

It is designed to provide the latest comprehensive study of current practices in the sanitary preparation, distribution, and storage of food. Legal requirements will be stressed.

Information may be obtained by writing the department of food engineering, Illinois Institute of Technology, Chicago 16, Illinois.

Correction

In the Jan. FI article, "How They Process Quick-Frozen Trout," the final phrase in the next to last paragraph (p. 198) should have read, ". . . frozen at —40 deg. F. under a wind blast." Through typographical error, the minus sign was omitted from the figure in the printed copy.

F&DA Food Standards

Status of food standards of Food & Drug Administration in early January is reviewed below.

Future Hearings

1. *Ice Cream*, new, standard of identity. Resumed prewar hearing, scheduled to begin Jan. 8; expected to be lengthy because of large number of potentially controversial subjects that require exploration (See separate story, pg. 185).

2. *Margarine*, amendments. Hearing requested by industry; to accept name "Margarine", to permit use of additives for flavor stability, to raise

Let J & L Steel Drums and Pails

help Your Products Sell Themselves

J&L STEEL

Representative samples of J&L's complete line of steel shipping pails showing (top to bottom) the ring seal, closed head and lug covers.

Your quality product and a J&L container are a combination that you can be doubly sure will catch the customer's eye. Besides affording maximum protection against damage or contamination, J&L Steel Drums and Pails offer an opportunity to add measurably to the sales appeal of your product. Our artists are at your disposal to assist you in creating a distinctive, decorative package.

We can provide all types of Closures, Finishes and Decorations

Heavy-duty ICC Drums	Light-gage Drums 55, 30 and 15 gal. capacity and 100-lb. Drums	Lightweight Drums for Chemical and Powdered materials	Steel Pails for Foods, Chemicals Oils—1-10 gal. cap.

Why not write for a free copy of our booklet "It's Safer to Ship in Steel." It will give you important information on J&L Steel Pails and Drums.

J & L STEEL BARREL COMPANY

A Subsidiary of Jones & Laughlin Steel Corporation

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New York 17, New York

PLANTS
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New York 17, N.Y.

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Name_____

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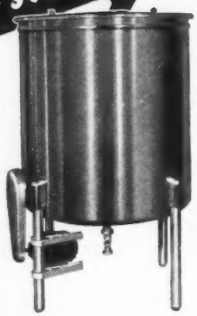
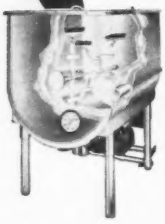
There's a STAINLESS STEEL SAN-I-TANK for every kind of food processing and storage



For example, Type "J" is a single shell tank, available in capacities from 60 to 1000 gallons, that will take standard fittings of all kinds, is especially adapted for storage or mixing purposes.



Type "CHR" is a jacketed tank for heavy or light processing, for cooking or cooling, and equipped with the famous horizontal "wiping action" agitator.

Write today for Bulletin SS-50, which describes Type "J" and other single shell tanks in detail. Write for Bulletins CHR-50 and JS-50 for detailed information about jacketed tanks.

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METAL GLASS PRODUCTS COMPANY

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vitamin A minimum content, and to specify method of vitamin analysis.

3. *Evaporated milk,* amendment. Hearing announcement rumored; would raise vitamin D content and would specify method of vitamin analysis.

Hearings in Progress

Fruit preserves, jellies, and butters, amendments, standards of identity. Opened on Jan. 2 with a number of witnesses presented by National Preservers Assn. One witness appeared for sucrose manufacturers. No witnesses appeared for dextrose manufacturers. No controversy developed; hearing adjourned Jan. 5 after 2½ days. (See announcement of this hearing, FOOD INDUSTRIES, January, pg. 154.)

Tentative Orders Awaited

1. *Canned mushrooms,* amendment, standards of identity and fill. Expected soon; hearing adjourned in June 1950, briefs filed in July.

2. *Residue tolerances,* on fresh fruits and vegtables; new. Not expected soon (see separate story in this issue, pg. 193).

Final Orders Awaited

1. *Canned corn,* amendment, standards of identity, quality, and fill. Expected soon; tentative order published in April 1950, exceptions filed in May.

2. *Cream cheese with (and) other foods: Neufchatel cheese spread with (and) other foods,* new, standards of identity. Expected soon.

3. *Bread,* new, standard of identity. Expected soon; effort being made to issue final order as soon as possible.

4. *Frozen fruits,* new, standards of identity and fill. Not expected soon. Exceptions were filed until January 2.

Standards Completed

None since last reported. (FOOD INDUSTRIES, October 1950, pg. 147.)

USDA Grade Standards

Recent actions by Production & Marketing Administration of U. S. Department of Agriculture on U. S. Grade Standards and related activities include the following:

Dried milk scorched particles, new, proposed, p. 8827, Dec. 13 *Federal Register,* written comments received until Jan. 12.

Milk for use in manufacture of dairy products, new, proposed, time for written comments further extended to June 30, by notice on p. 8933 of Dec. 15 *Federal Register.*

Dressed poultry, inspection for condition only, application and contract

New 1951 CHEVROLET TRUCKS

Better before...now better than ever

America's best truck investment is an even better one for '51! Yes, this latest line of Advance-Design trucks combines the greatest of Chevrolet's traditional advantages with new features and improvements that make your dollars go farther than ever! Along with outstanding power and economy, finest construction and superior handling ease, Chevrolet Advance-Design trucks offer new, improved-design brakes, new Ventipanes, and Chevrolet's new cab seats—plus a host of other features that mean increased value to owners. See your Chevrolet dealer and look over this new line of 1951 Chevrolet trucks today. They're "best buys" every one!

CHEVROLET MOTOR DIVISION *General Motors Corporation* DETROIT 2, MICHIGAN

CHEVROLET

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TWO GREAT VALVE-IN-HEAD ENGINES—the 105-h.p. Loadmaster or the 92-h.p. Thriftmaster—to give you greater power per gallon, lower cost per load • **POWER-JET CARBURETOR**—for smooth, quick acceleration response • **DIAPHRAGM SPRING CLUTCH**—for easy-action engagement • **SYNCHRO-MESH TRANSMISSIONS**—for fast, smooth shifting • **HYPOID REAR AXLES**—for dependability and long life • **NEW TORQUE-ACTION BRAKES**—for light-duty models • **PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES**—for medium-duty models • **NEW TWIN-ACTION REAR BRAKES**—for heavy-duty models • **NEW DUAL-SHOE PARKING BRAKE**—for greater holding ability on heavy-duty models • **NEW CAB SEATS**—for complete riding comfort • **NEW VENTIPANES**—for improved cab ventilation • **WIDE-BASE WHEELS**—for increased tire mileage • **BALL-TYPE STEERING**—for easier handling • **UNIT-DESIGN BODIES**—for greater load protection • **ADVANCE-DESIGN STYLING**—for increased comfort and modern appearance.

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HEAT EXCHANGERS

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DOWNINGTOWN takes justifiable pride in knowing that through these years, they have never once sacrificed *quality* for price. The many developments in the variety of metals, and methods of fabricating these metals, have made our work most interesting and, we like to feel that we have contributed, in a small way, to advancing the economy of our Country.

DOWNINGTOWN would like to work for you and with you. Our facilities include the finest of plant equipment, skill and "Know-how". We are strategically located on the main line of the Pennsylvania Railroad, with important cities and towns and steel-producing centers being close-by.

DOWNINGTOWN also maintains a Heat Transfer Division under the direction and supervision of men thoroughly trained and experienced in this field.

May we be of help to you? Useful literature will be gladly sent upon request on your Business Letterhead.

DOWNINGTOWN IRON WORKS, INC.

DOWNINGTOWN, PA.

NEW YORK OFFICE, 30 CHURCH STREET

forms amended, effective Jan. 22, p. 9217, Dec. 23 *Federal Register.*

Dressed poultry (New York), exempted from compliance with certain sanitary requirements of USDA's new regulations until May 1, "because of the shortage of materials needed to bring poultry processing plants into compliance with Par. 70.16 of the regulations"; p. 9425, Dec. 30 *Fed. Reg.*

Rye, amendment, proposed, to decrease the maximum limits of thin rye permitted in grades Nos. 1, 2, and 3; public hearings scheduled for Minneapolis (Feb. 6), Omaha (Feb. 7), and Chicago (Feb. 8), and written comments received in Washington, D. C. until Feb. 20; p. 8826 Dec. 13 *Fed. Reg.*

Soybeans, amendments, proposed, to decrease the maximum limits for foreign material and for moisture content 1 percent in each numerical grade; public hearings scheduled for Toledo (Jan. 29), Chicago (Jan. 30), Cedar Rapids (Jan. 31), Decatur, Ill. (Feb. 2), and Minneapolis (Feb. 5), and written comments received in Washington, D. C. until Feb. 15; p. 8826, Dec. 13 *Federal Register.*

Schedule of Events

FEBRUARY

5–10—Oregon State College, 30th annual canners' and freezers' school; Corvallis, Ore.

6– 9—Ohio State University, dairy technology conference; Columbus, Ohio.

11—National Egg Products Assn., annual meeting, Auditorium; Kansas City, Mo.

11–13—Institute of American Poultry Industries, fact-finding conference; Municipal Auditorium, Kansas City, Mo.

14–16—Western States Meat Packers Assn., annual meeting; Palace Hotel, San Francisco.

17—Peanut Butter Manufacturers Institute, annual meeting; Morrison Hotel, Chicago.

17–25—National Canners Assn., in conjunction with National Food Brokers Assn., and Canning Machinery & Supplies Assn.; Stevens Hotel, Chicago.

21–23—Purdue University, 6th industrial waste conference; Lafayette, Ind.

27–March 2—National Assn. of Frozen Food Packers, et al, frozen food industry convention; St. Francis Hotel, San Francisco.

MARCH

12–14—Northwest Canners Assn., 37th annual convention; Davenport Hotel Spokane, Wash.

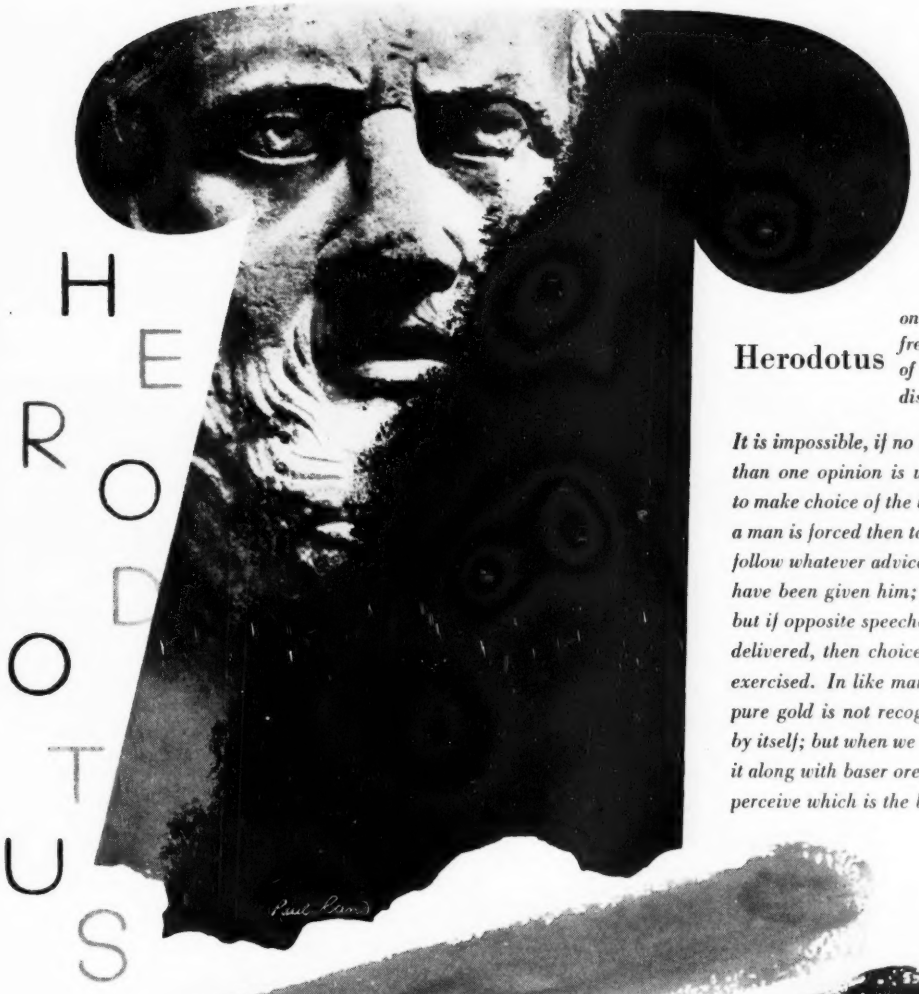
12–17—State College of Washington, 20th annual institute of dairying; Pullman, Wash.

APRIL

17–20—American Management Assn., 20th annual packaging exposition; Auditorium, Atlantic City, N. J.

30–May 4—American Material Handling Society and Material Handling Institute, conference and 4th annual exposition; International Amphitheatre, Chicago.

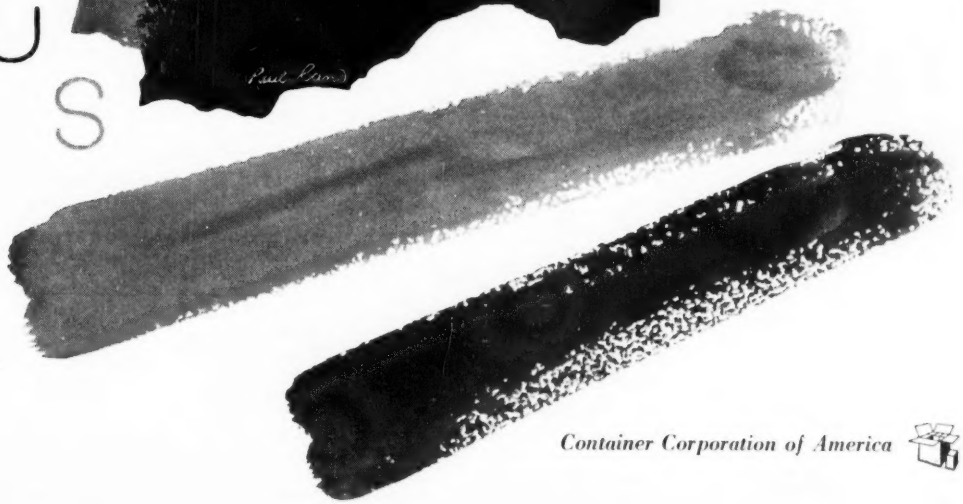
—*End*



Herodotus

on freedom of discussion

It is impossible, if no more than one opinion is uttered, to make choice of the best: a man is forced then to follow whatever advice may have been given him; but if opposite speeches are delivered, then choice can be exercised. In like manner pure gold is not recognized by itself; but when we test it along with baser ore, we perceive which is the better.



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FIRST IN POWER TRANSMISSION MACHINERY!

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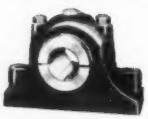
TORQUE-ARM SPEED REDUCERS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NAME PLATES

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, CHICAGO THRIFT-ETCHING CORPORATION, 1555 SHEFFIELD AVENUE, CHICAGO, ILLINOIS

Changes in Food Supplies

Stocks

CANNED FRUITS AND VEGETABLES in canners' hands December 1, compared with same date a year ago, were reported by the National Canners Association as follows:

	(000 omitted) Actual Cases	
	1949	1950
Sweet corn	26,968	15,988
Peas	13,909	14,740
Tomato juice	15,917	13,346
Pumpkin and squash	447	267
Red pitted cherries	1,202	1,680
Apricots	1,818	1,427
Sweet cherries	804	485
Peaches	12,604	6,693
Pears	3,354	3,945
	Dozens	
Baby food	52,167	58,827

Production

The following fruit and vegetable packs for 1950 were recently reported by the National Canners Assn.:

CANNED PEARS: 6,370,000 cases on a 2½'s basis, compared with 5,903,870 cases canned in 1949.

CANNED PEACHES: (Revised), 16,604,901 on a 2½'s basis, as against 19,133,748 cases canned in 1949.

CANNED TOMATO JUICE: 26,180,000 cases on a 24/2's basis, compared with 23,542,000 cases in 1949.

CANNED PUMPKIN and SQUASH: 1,777,803 actual cases, more than double the 1949 pack of 843,210.

CANNED FRESH LIMA BEANS: 3,229,000 cases on a 24/2's basis, compared with 4,371,000 cases in 1949.

FROZEN PEACHES packed in 1950 declined to 18,654,838 lb., in the compilation of the National Assn. of Frozen Food Packers. This was almost 20 percent under the 1949 pack of 23,234,608.

MARGARINE produced in November reached a total of 93,852,000 lb., with 63,223,000 lb. colored, 30,629,000 lb. uncolored. Production in November, 1949, totaled 71,278,000 lb., 19,414,000 lb. colored, 51,864,000 lb. uncolored. October production totaled 73,940,000 lb. Total for the first eleven 1950 months was 848,000,000 lb., compared with 783,000,000 lb. in the same 1949 period.

CREAMERY BUTTER output in November came to 75,720,000 lb., 18 percent under November, 1949 and 2 percent under the 5-year average for the month. October-November decline was 18 percent, the same as the 5-year average. The drop was 11 percent in 1949.

AMERICAN CHEESE produced in November is estimated at 45,550,000 lb., 12 percent under November, 1949, and 4 percent below the 5-year average for the month. October-November decline was 22 percent, as is the 5-year average for the month. Year before the decline was 18 percent.

ICE CREAM production in November, estimated at 35,020,000 gal., was 4 percent larger than November, 1949, and only 2 percent under the 5-year average for the month. October-November decrease was 16 percent, compared with a 13 percent drop in 1949 and a 19 percent decline in the 5-year average.

LIQUID EGG production in November was down to 6,072,000 lb., compared with 8,812,000 lb., for November, 1949 and a 5-year average of 13,513,000 lb.

Storage

FROZEN FISH AND SHELLFISH held in storage December 1 totaled 164,989,779 lb., compared with 158,718,877 lb. held the same date a year ago.

PUBLIC FREEZER space declined 1 point during November to stand at 77 percent on November 30. Occupancy stood at 73 percent on the same 1949 date, while the average for the date is 80 percent.

PUBLIC COOLER space also dropped a point during November, being 71 percent occupied on November 30. This was 4 points above the year before, however, and 2 points above the average for the date.

Indexes

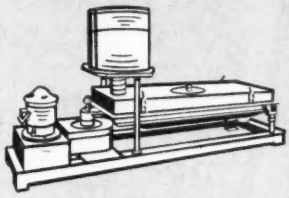
THE COMMODITY INDEX on Foods, compiled by the *New York Journal of Commerce*, rose to 194 for the week ending Jan. 19, which compares with 192.5 for the previous week, 193.1 for December, and 168.5 for January, 1950.

Business Week's index of business activity was up to 231.2 for the week ending Jan. 13, compared to the preceding week's 229.4. A month before it stood at 229.8, and a year earlier, 194.8.

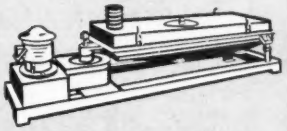
PATTERSON

"Gyro-centric"

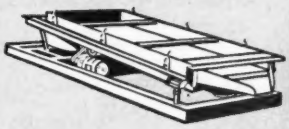
SCREENS



For efficient separation of dry materials . . .



of almost any kind —and materials in liquid suspensions



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Carpenter's New Slide Chart Gives Data on Stainless Tubing

Bending information for Stainless Tubing and Pipe shows desirable radii for bends of 45° to 180°.

Coil diameters for Stainless Steel Pipe from ⅛" to 4" are given in easy-to-use form.

DESIRABLE BENDING and COILING RADII for Carpenter STAINLESS TUBING and PIPE
THE CARPENTER STEEL COMPANY
ALLOY TUBE DIVISION • UNION, NEW JERSEY

The Carpenter Stainless Tubing Slide Chart gives you data on Analyses, Standard Sizes, Bends with and without Mandrels, Tensile Strength, Rockwell Hardness, Heat Resistance, etc.

If you would like a copy of this useful Slide Chart published by Carpenter, just drop us a note on your Company letterhead. We'll be glad to put one in the mail for you.

THE CARPENTER STEEL COMPANY
Alloy Tube Division, Union, N. J.
Export Department: Carpenter Steel Co., Reading, Pa.—"CARSTEELCO"

Carpenter
STAINLESS TUBING

more than corrosion resistance

Analysis · Tolerance · Finish

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Men, Jobs, Companies

ALFRED Y. MORGAN has been elected president of the White Rock Corp., New York City, subsidiary of National Distillers Products Corp. He headed the Morgan Beverage Co. for 23 years until WR bought it.

WILLIAM L. CAMPBELL, organizer and head of the food technology department at MIT, has been made a vice-president of Food Machinery & Chemical Corp., with headquarters in San Jose, Calif.

WILLIAM E. CARTER has been elected vice-president in charge of operations of The Kroger Co. He had been general manager heading up the operations of the Cincinnati, Ohio company for the past three years.

LELAND S. ARGALL has been made a vice-president and director of California Packing Co. and has also been named to the executive committee. He is in charge of eastern canned food production.

Industry

Barnett Laboratories, Long Beach, Calif., is operating a new plant at Temecula, Calif., for the production of carotene.

Beatrice Foods Co., Chicago, has purchased the plant of the Momence Cooperative Milk Co., Momence, Ill. About 1,000 lb. of milk are processed daily.

Chicago Section, Institute of Food Technologists, has elected the following officers for 1951: Berton S. Clark, American Can Co., Chairman; Virgil O. Wodicka, Libby, McNeill & Libby, Vice-Chairman; George E. Brissey, Swift & Co., Treasurer; and Dorothy A. Huber, QM Food & Container Institute, Secretary.

Foremost Dairies, Inc., will sell under its own brand name frozen concentrated orange juice packed by the Florida Citrus Exchange. Outlets will be in the east, southeast and Texas area.

Green Giant Co. is converting its Waitsburg, Wash., cannery from a one-floor to a three-floor plan to allow a gravity-flow operation.

Interstate Bakeries, Inc., Kansas City, has bought controlling interest in the O'Rourke Baking Co., Inc., Buffalo, N. Y. Terms were not disclosed, but the Buffalo bakery is valued at $2,000,000.

Kellogg Co., Battle Creek, Mich., will soon be making corn flakes and Rice Krispies in a $600,000 cereal plant in Queretaro, Mexico. Since it was founded 20 years ago, the W. K. Kellogg Foundation has made financial grants of over $32,000,000 to research and improvement in medicine, dentistry, education, public health and kindred fields.

Lamont, Corliss & Co., New York, will start production soon in the 30,000-sq.ft. expansion to its new chocolate plant, Peter Cailler Kohler Swiss Chocolate Co., Inc., Fulton, N. Y.

McCormick's Ltd., biscuit and confectionery manufacturer, has announced construction of a $175,000 addition to its London, Ont., plant.

Northwest Frozen Foods Assn. has elected the following new officers: A. B. Chappel, R. D. Bodle Co., President; F. M. Smith, Vice-President; and E. M. Burns, Secretary-Treasurer.

Northwest Packing Co., Portland, Ore., has taken over operation of a former Case-Swayne cannery in North Portland.

Sick's Seattle Brewing & Malting Co. will double production at its Spokane, Wash., brewery by means of a $750,000 program.

Snow Crop Marketers Div., Clinton Foods, Inc., has announced a complete realignment of the sales organization. Four major sales divisions throughout the country have been established.

Standard Brands, Inc., is constructing a two-story reinforced concrete addition to its Chase & Sanborn coffee plant in San Francisco. Company's coffee plant in Chicago is also being expanded by 50,000 sq.ft.

Titman Egg Co., New York City, has purchased a plant at Indianapolis, Ind., to operate exclusively for egg breaking.

Washington Canners Assn. has begun construction of a new plant at Vancouver, Wash., estimated to cost $80,000 with an additional $170,000 for equipment.

Personnel

Karl E. Baumgarner has been named president of Terminal Flour Mills. Marc P. Miller was named vice-president and treasurer, and W. R. Debus assistant general manager.

Roland M. Bethke, formerly assistant director Ohio Agricultural Experiment Station, has become vice-president in charge of research and product control of the Ralston Purina Co.

Brown W. Cannon has been appointed a member of the board of Beatrice Foods Co., filling vacancy caused by

DETECTO SCALES

There's a precision-accurate Detecto Scale for your specific weighing and counting need. The Detecto helps increase production, yet assures you maximum accuracy by making slightest weight discrepancies immediately visible.

DETECTO-GRAM RATIO COUNTING SCALE

Another Detecto-Gram Scale to speed counting operations. Model #1743 has a special counting tray attached to the beam for use when counting in odd amounts.

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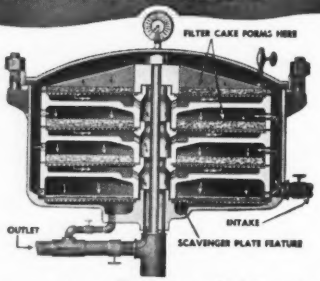
SCALE ENGINEERS IN ALL PRINCIPAL CITIES

FOR HIGH SPEED, UNIFORM FILTRATION REQUIRED IN FOOD PROCESSING

SPARKLER *horizontal plate* FILTERS

Capacities 50 G.P.H. to 5000 G.P.H.



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Candy Scrap
Chicken Broth
Cider
Egg Albumen
Extracts
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Honey
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Liquors
Milk
Molasses
Vegetable Oil
Syrups
Vinegars
Wines
Fruit Juices
Alcohols
Alkalies
Beverages

Sparkler Filters operate on a distinctive principle, using horizontal plates, that are particularly efficient in maintaining uniformity in operation over a wide range of pressure, temperature, or viscosity conditions.

Filters water sparkling clear, removes all off-tastes, odors, color, sediment, chlorine, sulphur, algae, pipe rust, etc.

Because filter media are supported on a horizontal plane and filter aids floated into position uniformly, filtration takes place uniformly over entire filtering areas. Flow through filter is always with gravity. The patented scavenger plate filters the last drop, leaving no hold over in batch filtration.

We invite correspondence on your problems. You will receive the advice of filtration engineers with over a quarter of a century experience in a specific field.

SPARKLER MANUFACTURING COMPANY

MUNDELEIN, ILLINOIS

JAMES M. GORMAN has been appointed director of the laboratory of the National Egg Products Assn. He has had comprehensive experience in plant processing and control with various companies in the egg field. He succeeds O. J. Kahlenberg who has gone with F. M. Stamber Co., St. Louis.

the death of his father, H. Brown Cannon.

Maurice L. Combs has been named western divisional production manager for Snow Crop Marketers Div., Clinton Foods, Inc. He will handle all products except citrus.

Horace B. Cosler, formerly production manager, Farley Mfg. Co., Skokie, Ill., is now with QM Food & Container Institute as food technologist, primarily responsible for development of confectionery items for Armed Forces rations.

Thomas E. Foster has been elected president of the Marin Dell Milk Co., San Francisco, succeeding Erskine Baker McNear, Sr.

Joseph K. Kane and Chris F. Zobel have been elected vice-presidents and directors of Rosenberg Bros. & Co., Inc., San Francisco.

Harold B. Manning has been appointed president of Weston Biscuit Co., Inc., a U. S. subsidiary of George Weston Ltd.

Arthur H. Mendonca has been elected president of the F. E. Booth Co., Inc., San Francisco.

George T. Peckham, Jr., research director of Clinton Industries, Inc., Clinton, Iowa, has been elected chairman of the American Chemical Society, division of sugar chemistry, succeeding Prof. W. Z. Hassid. Dr. Roy L. Whistler, of Purdue Univer-

sity, was named chairman-elect, and J. M. D. Brown, chief chemist, Revere Sugar Refinery, was elected secretary.

Lloyd A. Royal, former acting director of the International Pacific Salmon Fisheries Commission since the death of B. M. Brennan, has been appointed director.

Herman H. Sancken has been named manager of the Albany, Ga., plant of the Dixie Dairies Div., Borden Co.

John M. Seabrook has been named executive vice president of Seabrook Farms Co. He has been in charge of farming operations for the past ten years.

Henry B. Smith, Jr., is now director of General Foods Engineering Research Laboratory, Hoboken, N. J.

R. S. Stark has been appointed general manager of Armour and Company's plant at Indianapolis, Ind., succeeding R. H. Borchers.

A. Allen Thomson, assistant vice-president, has been elected vice-president in charge of the sugar department of Pepsi-Cola Co.

Robert M. Wellwood has been elected chairman of the board of Sheffield Farms Co., subsidiary of National Dairy Products Corp. C. R. Roberts was elected president and chief executive officer and Edward H. Miller as executive vice-president.

Associated Industry

Cryovac Div., Dewey & Almy Chemical Co., Cambridge, Mass., has hired John M. Cook for development and sales service work on frozen foods.

Dow Corning Corp., Midland, Mich., has recently decided to take over the actual plant operation of the bakery pan glazing service located near Detroit and known as Avon Industries, Inc. Dow will merely operate the plant for Avon.

Hamilton Div., Baldwin-Lima Hamilton Corp., Hamilton, Ohio, has named George H. Lynn general sales manager in charge of canning machinery and diesel engines.

National Starch Products, Inc., has named Donald P. Pascal vice-president in charge of sales with headquarters in New York City.

Norda Essential Oil & Chemical Co., Inc., New York, has appointed

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ON NITROGEN IN THE FOOD INDUSTRIES

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★ "Where Trim the Oxygen Content". *Methods for determining where and how to decrease harmful oxygen content of liquid foods.*

★ "Juice Color is Bettered by a Gas Blanket". *Nitrogen blanketing of fruit pulping operations. Applicable to vegetable products.*

★ "Relationship of Headspace and Dissolved Oxygen in Liquid Food Containers". *Sample calculations and nomographs for determining effective oxygen exclusion.*

★ "Nitrogen Protection of Edible Oils". *How to maintain peak oil quality from refinery to consumer.*

★ "Wrapper Test Promises More Shelf Life". *Simplifies choice of oxygen-excluding film for effective gas packing.*

★ "How Nitrogen Protects the Quality of Foods". *How various processors protect their products against oxidation deterioration.*

★ "Liquid Nitrogen Pulverization". *Continuous pulverization of food products, spices, without loss of volatiles, changes in flavor.*

★ "Practical Factors in Nitrogen Packing Using Flexible Film". *Machine, film, and packing requirements for prevention of food spoilage.*

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HOWARD M. CHAPIN has been promoted to the newly created position of marketing manager for the Birds Eye Div. of General Foods Corp.

Leonard S. Brooks western division sales head, with headquarters in Los Angeles.

Peel-O-Matic Corp., Baltimore, has merged with the Peeling Co. and henceforth will be known by the former name.

Rose Exterminator Co., San Francisco, has engaged Keith A. Fitch to organize and manage a sanitation department that will offer inspection and advisory service to food processors.

Deaths

Graham Adams, 59, former president and secretary, National Dehydrators Assn., Chicago—Nov. 21.

Nessim Alhadeff, 65, president of the Whiz Fish Products Co., Seattle—Dec. 7.

Charles A. Brooks, 88, vice-president Great Atlantic & Pacific Tea Co.—Dec. 17.

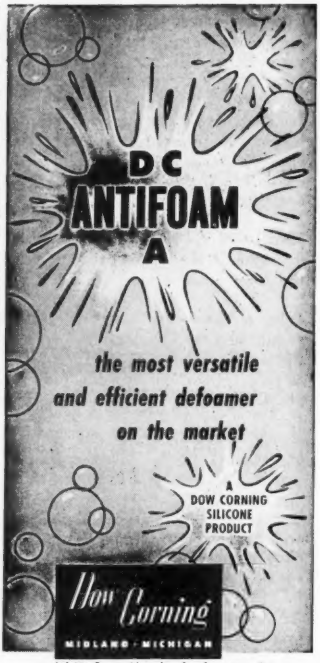
Charles H. Emery, 88, nationally known authority in the canning industry—Dec. 8.

William Pratt Heath, 75, pioneer chemist in the development of Coca-Cola, and one of the few men who knew the secret formula—during December.

W. F. Jensen, former executive secretary of the American Butter Institute—Nov. 7.

Leo E. Walsh, 54, vice-president of Ambrosia Brewing Co., Chicago—Dec. 16.

—End



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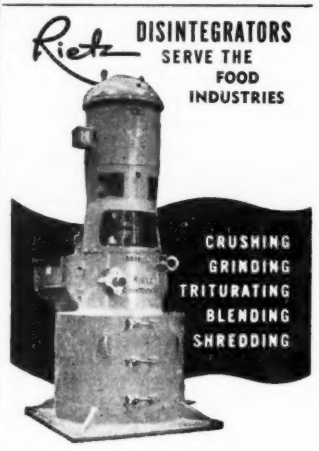

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Books

Macintire's Refrigeration Book Is Brought Up to Date

REFRIGERATION ENGINEERING, 2ND EDITION. *By H. J. Macintire and F. W. Hutchinson. Published by John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y., 1950. 610 pages; 6¼x9¼ in.; cloth. Price, $6.50.*

Expansion, modernization and revision of this work were made necessary by the developments in refrigeration since the appearance of the first edition, 13 years ago. New material in the book covers a wide range, such as the analysis of transient phenomena, including pull-down, subcooling and delayed heat-up through use of partial load emergency equipment. Also added is a discussion of heat pumps from the standpoint of both the thermodynamic cycle analysis and transient heat flow problems associated with energy sources and energy sinks.

Over 30 full page graphic solutions give the values of the film coefficient of heat transfer for most of the commonly used refrigerants, when being heated or cooled as either a superheated vapor or a subcooled liquid. Another chapter covers the influence of radiation effects in determination of equilibrium cold storage temperature.

Revision of other chapters carry out the book's original purpose to provide the engineer with modern data on essential principles and on the progress of commercial machinery. The book's dual function as a reference for practicing engineers and as a textbook has been carefully preserved. In the latter case it has been strengthened by expansion of the section on revised cycle theory from two to eight chapters and by regrouping of chapters to form rationally organized sections on theory, load, equipment, and application.

While H. J. Macintire was the sole author of the original edition, credit for this revision rests largely with F. W. Hutchinson, with whom Professor Macintire had discussed it at length shortly before his death. Well remembered for his work on the subject at the University of Illinois, Professor Macintire had previously published the *Handbook of Mechanical Refrigeration.* Professor Hutchinson is professor of mechanical engineering at the University of California.

Aid to Food Research

ANNUAL REVIEW OF MICROBIOLOGY, VOL. IV. *Edited by Charles Clifton, Sidney Raffel and H. Albert Barker. Published by Annual Reviews, Inc., Stanford, Calif., 1950. 383 pages; 6¼x9 in.; cloth. Price $6.*

Three of the chapters in this review can be highly recommended to the food research worker: Electron Microscopy of Microorganisms and Viruses, by J. Hiller; Bacterial Metabolism, by L. O. Krampitz; and Newer Antibiotics, by W. E. Herrell.

Protein Data

CHEMISTRY AND BIOLOGY OF PROTEINS. *By Felix Haurowitz. Published by Academic Press, Inc., 125 E. 23rd St., New York, N. Y., 1950. 374 pages. 6¼x9¼ in.; cloth. Price, $5.50.*

Specialists in the more progressive food company laboratories will find this work valuable, particularly where protein research has gained headway.

A correlated, uniform outline of the present state of protein knowledge is attempted by the author. He recognizes that completeness could not be expected in a book of this kind, but he has kept close to the fundamental aspects, such as protein structure, biological activity, and biosynthesis of proteins in the living cell. A large space, in fact, is devoted to enzymes, hormones and immunologically active proteins.

On the negative side, a discussion of protein technology is not attempted, nor is protein metabolism in different animal and vegetable species. Ample references are offered, however, for readers interested in such special aspects of the subject.

Individual Oils

THE ESSENTIAL OILS, VOL. 4. *By Ernest Guenther. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York, N. Y., 1950. 752 pages; 6¼x9¼ in.; cloth. Price, $12.*

This volume continues the presentation of monographs on individual essential oils begun in Vol. 3. The

Stiff inner fibers with strength to remove heavy refuse — on first stroke.
Outer casing of horsehair simultaneously brushes fine dust. Thorough sweeping means fewer strokes. Saves Time.

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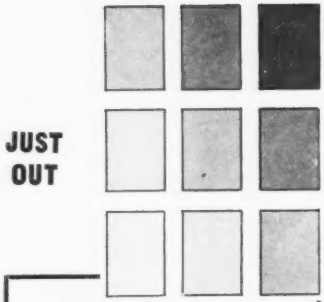

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Government Publications

GENERAL PROCEDURE FOR MANUFACTURING SWISS CHEESE. *By George P. Sanders et al. U. S. Department of Agriculture. Circular No.* 851. *Price* 10*c.* This manufacturing process description is intended for those who have only limited experience and also for those who want general information about the manufacture of Swiss cheese in this country.

ABSTRACT BIBLIOGRAPHY OF THE CHEMISTRY AND TECHNOLOGY OF PEANUTS, 1830 - 1939. *Compiled by Nelle J. Morris and F. G. Dollear. Bureau of Agricultural & Industrial Chemistry, AIC* 151. *Mimeographed. Obtainable from Southern Regional Research Laboratory, New Orleans* 19 *La.,* An extended bibliography, with abstracts of articles, many of which are important in fats and oils investigations.

These recently issued documents are available at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered from the Bureau responsible for its issue.

MAPLE SYRUP PART I, RESEARCH PROGRAM ON MAPLE PRODUCTS AT THE EASTERN REGIONAL RESEARCH LABORATORY. PART II, A NEW HIGH FLAVORED MAPLE SYRUP. *By C. O. Willits and W. L. Porter. Bureau of Agricultural & Industrial Chemistry. Part I, AIC-*268. *Part II, AIC-*269. *Available from Eastern Regional Research Laboratory, Philadelphia* 18, *Pa. Mimeographed.*

NUTRITION. *Department of the Army Technical Manual TMS* 501. *Price* 20*c.* A guide for Medical Department officers in their responsibilities in the field of nutrition for the Army.

BOILING POINTS OF COTTONSEED AND PEANUT OIL MISCELLAS IN ENGLISH UNITS. *By Kenneth M. Decossas, et al. Bureau of Agricultural & Industrial Chemistry, AIC-*257. *Mimeographed. Obtainable from Southern Regional Research Laboratory, New Orleans* 19, *La.*

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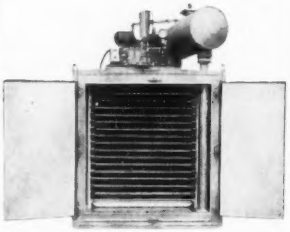

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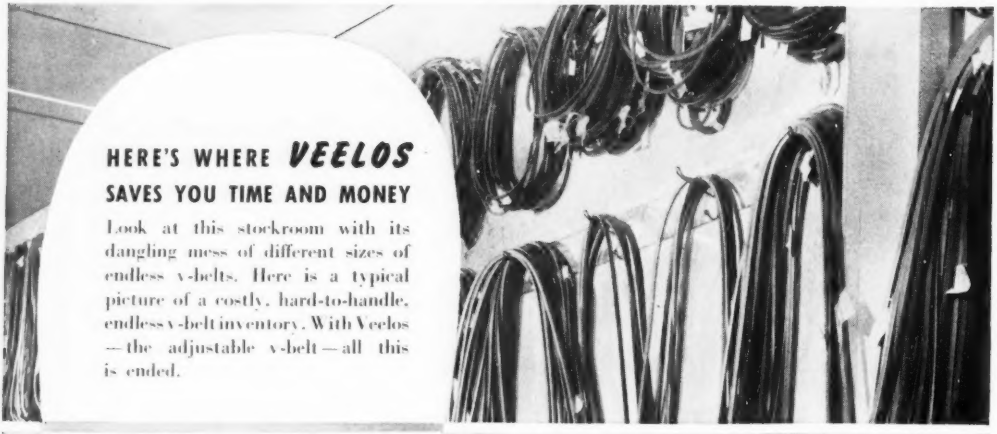

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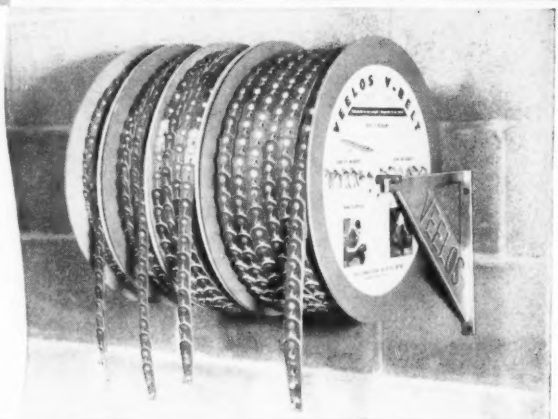

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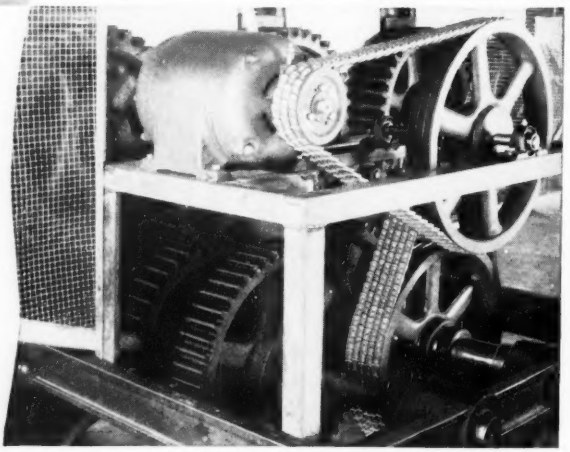

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Equipment Catalogs, Bulletins

New 'HTST' Can-Sterilizing Process

Titled *A New Principle for Agitating in Processing of Canned Foods*, 24-page Bulletin 20 presents a new sterilizing process designed to improve food products and speed heating and cooling. Key is the end-over-end rotation of the sealed can which permits the most rapid rate of heat penetration. Achieved is an improvement in texture, flavor, color and thiamin retention of many "heat sensitive" products.—*Research Dept., Continental Can Co., 100 E. 42 St., New York 17.*

Quality Control for Brewers

The principal methods by which a laboratory aids the brewery in maintaining rigid control over the production of fine beers and ales are detailed in a well-illustrated 32-page brochure. Special section gives complete instructions on the use of the following products of this laboratory's research: Ceresalts, Foamdex, Colox, Yeast Life, Chilko, and Lactine.—*J. E. Siebel Sons' Co., 741-747 W. Jackson Blvd., Chicago 6.*

Comprehensive Handbook on Wire, Filter Cloth

Described as the most complete publication of its type—and hence valuable as a handbook—126-page Catalog 50 contains full listing and illustrations of wire cloth, filter cloth and fabricated products, and sections on engineering design, research, and technical data. Highlight of the research section is a report on 18 months of investigation of flow characteristics and particle retentivity of metallic filter cloths.—*Multi-Metal Wire Cloth Co., Inc., 1350 Garrison Ave., New York 59.*

Paint Specifications for Every Plant Use

Knowing what finish to use on which surface can be of the greatest help in food plant maintenance. This 24-page guide, aimed at just that, lists paint specifications and directions for the following types of finishes: Exterior, metal protective, interior, mill-white, color harmony, and painter craft. There are also six pages of color guides, with actual samples of the paints.—*The Sherwin-Williams Co., Cleveland 1.*

Food Plant Equipment

Vibrating Screens

Concentric-acting vibrating screens for medium and heavy-duty service are pictured and dimensioned in 12-page Book 2354. Sizes range from 3 ft. wide by 8 ft. long to 6 ft. wide by 16 ft. long; in single, double or triple deck models and for suspended or floor mounting.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1.*

Vapor Purifiers

Eight-page vapor purifier engineering manual has tables and formulae for easy selection of correct size to solve entrainment problems in vapor, steam, gas and air applications. Drum, evaporator, receiver and line units are covered.—*The Centrifix Corp., 3608 Payne Ave., Cleveland 14.*

Wrapping and Slicing Machines

Thirty separate 2- and 4-page folders cover complete line of wrapping and automatic slicing machines. Of special interest is 4-page folder detailing new wrapping unit for seafood packers.—*Hayssen Mfg. Co., Sheboygan, Wis.*

Conical Dry Blender

Applications and operation of new conical dry blender are pictured and specified in 12-page Catalog 509. Explanation of positive blending principle is included.—*The Patterson Foundry & Machine Co., E. Liverpool, Ohio.*

Small-Size Gravity Feeder

Midget weighing belt feeder for dry materials is described in 8-page Bulletin 35-G5. Unit has a positive non-flooding feeding mechanism, an unusual capacity of from a few cubic inches to 3 cfm. and a feeding range of 100:1—*Omega Machine Co., 345 Harris Ave., Providence, R. I.*

Compressors Feature Roller Bearings

The first horizontal duplex motor-driven compressors available with anti-friction roller bearings throughout are particularized in 28-page Bulletin 726-5. The bearings are said to last as long as the compressor itself.—*Chicago Pneumatic Tool Co., 6 E. 44 St., New York 17.*

Skinning and Fleshing Units

Sixteen-page booklet specfies the following machines: Pork-cut skinner, bacon skinner, membrane remover, and skinning and fleshing machine.—*Townsend Engineering Co., 315 E. 2 St., Des Moines, Iowa.*

Line of Motors

Extensive line of motors for the food industry is presented in 8-page bulletin. Types covered are: Sanitary, Varidrive, Syncrogear, totally enclosed, and Verticlosed.—*U. S. Electrical Motors, Inc., Milford, Conn.*

Accurate Weighing Method

Newly developed weighing method and unit, called Hy-Tra-Lec and based on positive displacement, is described in 4-page folder. For exact filling of free-flowing dry products, its range is from ¼ to 16 oz. net.—*Wright Machinery Co., Durham, N. C.*

Fressure, Temperature Regulators

Pictures of different models of pressure and temperature regulators and desuperheaters are contained in 4-page folder.—*Spence Engineering Co., Inc., Walden, N. Y.*

Heat Exchange, Air Conditioning Units

Series of 2-page folders, each picturing and specifying a particular unit, presents the following: Horizontal multipass shell and tube condensers; electric defrost unit cooler; fin surface air units; wetted surface brine defrost units; dry-type air units; ceiling-type units; belt-ice maker; liquid receivers; and vertical shell and tube condensers.—*Buildice Co., Inc., 2610 S. Shields Ave., Chicago 16.*

Steam and Air Float Traps

Sizes and cross-sections of float traps, air release valves, strainers and steam traps are given in 4-page Bulletin 950.—*V. D. Anderson Co., 1935 W. 96 St., Cleveland 2.*

Sanitary Pumps

Corrosion-resistant sanitary pumps with O-ring rotary seals are fully delineated in 46-page Bulletin 1950. The new shift-speed unit for HTST pasteurizers is included.—*Waukesha Foundry Co., Waukesha, Wis.*

Mechanical Dust Collector

Engineered for capacities from 1,500 to 1,000,000 cfm., mechanical dust collector is graphed and diagrammed in 8-page bulletin. It utilizes aerodynamic principle of dust separation.—*Aerodyne Development Corp., 879 Addison Rd., Cleveland 14.*

Automatic Valves

Pressure relief and reducing valves, and controls for hot water heating systems, are outlined in 8-page Bulletin 299. A new fully-automatic reseating relief valve, called Tempo, is announced.—*A. W. Cash Valve Mfg. Corp., Decatur, Ill.*

Heaters, Deaerators, Softeners

Six-page Bulletin 103 features flow diagrams of heaters, deaerators and hot process softeners.—*Belco Industrial Equipment Div., Inc., Paterson 3, N. J.*

Motors for Concentrators

Specifications and dimensions of motors used in making frozen concentrated citrus juice are offered in 12-page brochure. Many production-line photos are featured.—*Ideal Electric & Mfg. Co., Mansfield, Ohio.*

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Any of these very-latest catalogs, bulletins, or folders will be sped to you gratis. Just note here the specific literature you want, then turn to the Reader Service section inside the back cover, where all items are listed by pages under the heading, "Editorial: New Technical Literature"—each one with a page key number after it. The key numbers also appear on the handy Reader Service postcard. So you circle those for the items desired, sign at the bottom, and mail. No postage needed.

Materials Handling

Electric Pallet Truck

Every detail of new model electric pallet truck is shown in 18-page book titled *An Engineering Achievement*. Unit handles loads up to 4,000 lb., and fork lengths vary from 36 to 72 in.—*Towmotor Corp., 1226 E. 152 St., Cleveland 10.*

Conveyor and Elevator Belting

Discussion of the various types of conveyor and elevator belting, including application and selection data, is presented in 16-page Bulletin 3679. Types covered are HT, A, C, neopreme, ruff top, canners, HH and Thermoglas.—*Thermoid Co., Trenton, N. J.*

Vibrating Conveyors

Advantages and applications of natural-frequency vibrating conveyors are set forth in

for
• SPRAYING • WASHING • RINSING • COOLING • AIR CONDITIONING

Get the most out of your Spraying Equipment with minimum power . . . with efficient spraying.

Use Yarway Nozzles. No internal vanes or other restrictions to clog or hinder flow. Two types—Yarway Involute-type producing a fine hollow spray with minimum energy loss, and Yarway Fan-type producing a flat fan-shaped spray with time-saving slicing action for cleaning.

Wide range of standard sizes and capacities. Cast or machined from solid bar stock.

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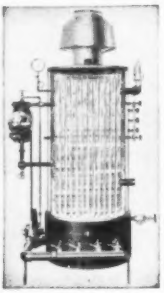

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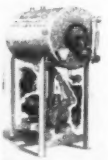

The M-K-O Automatic Boiler Feed returns condensate and supplies small quantities of hot water as needed to the KANE Boiler.

Each KANE BOILER PACKAGE is carefully considered by us as an "individual" job—from the customer's requirements to the finished unit. And each BOILER PACKAGE is a compact, self-contained steam source that includes: the correctly sized KANE Automatic Gas-Fired Boiler complete with gas burner and controls to maintain required steam pressure; and an M-K-O Automatic Boiler Feed system designed to return condensate and supply make-up water as required for highest operating efficiency.
Engineered Steam at its best with four decades of experience at your disposal—so, send your steam problem to us for study and recommendation.

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FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE

12-page bulletin. Different types of these conveyors are shown.—*Whitley-Cartier Co., Inc., 805 W. Main St., Louisville 2, Ky.*

Fork Lift Trucks

Specifications and features of two new 2,000-lb. capacity Lev-R-Matic fork lift trucks are set forth in 6-page Bulletin M-410. One model is stand up type, other sit down.—*Mobilift Corp., 835 S. E. Main St., Portland 14, Ore.*

Pallet Design Data

Practical pallet design information, including working drawings, is offered in 16-page Bulletin P476. Hydraulic lift trucks for loads up to 2 tons are also illustrated.—*Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9.*

Control Equipment

Dairy Recording Instruments

Specifications and performance details of recording thermometers and pressure gages for the dairy industries are given in 12-page Catalog 1140B. Type 3A sanitary bulbs and fittings, and dairy charts are also listed.—*Tagliabue Instruments Div., Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.*

Electronic Instruments

Line of strip-chart Dynamaster electronic instruments is described in Bulletin W1821. Covered are units for recording and indicating such variables as temperature, resistance, conductivity, inductance, pressure and force.—*The Bristol Co., Waterbury 20, Conn.*

Liquid Rheostat

Construction and operating features of a liquid rheostat that provides stepless, wide-range speed control of wound rotor motors are set forth in 2-page Bulletin 14S7544. It gives full resistance range in 10-in. travel.—*Allis-Chalmers Mfg. Co., Milwaukee 1.*

Monel Tube Gages

Specifications, dimensions and prices on line of Monel tube gages up to 10,000 psi. are given in 4-page Bulletin 211G. Cross-sectional diagram is included.—*Crosby Steam Gage & Valve Co., Wrentham, Mass.*

Plant Supplies

Essential Oils, Flavors Listing

Latest quantity and price listings on essential oils, balsams, oleoresins, concentrated flavors and basic perfume materials are recorded in 50-page catalog.—*Magnus, Mabee & Reynard, Inc., 16 Desbrosses St., New York 13.*

Rubber Mountings

Featuring a step-by-step description of installation methods, 4-page Catalog Section 7290 depicts recently introduced Vibropad mountings. They are 12-in. square rubber pads designed to muffle the shock, noise and vibration of operating machinery.—*B. F. Goodrich Co., Akron, Ohio.*

Protective Linings for Containers

The Inside Story of Protective Linings for Steel Containers, 12 pages, describes linings for drums for packaging animal and vegetable oil and fatty acids, strong solvents, food products, etc.—*The Glidden Co., 11001 Madison Ave., Cleveland 2.*

Lubrication Application

Four-page folder gives use and application data on 25 different densities of lubricants,

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from liquid greases to heavy cup types.—*Master Lubricants Co., Meadow & Jackson Sts., Philadelphia.*

Corrosion-Resistant Materials

Industrial coatings, adhesives, process equipment linings, extrusions and chemical tubing and piping are covered in 8-page bulletin.—*Murray Products Inc., 12500 Crossburn Ave., Cleveland 11.*

Surface Active Agents

Condensed descriptions of edible surface active agents for the food industry are contained in 4-page folder. Included are emulsifying, stabilizing, defoaming, thickening, suspending, and softening agents.—*Glyco Products Co., Inc., 26 Court St., Brooklyn 2, N. Y.*

Centralized Lubrication Systems

Fully and semi-automatic and manual controlled centralized lubrication systems are presented in 8-page bulletin. Applications and operation are highlighted.—*Lincoln Lubricating Equipment Co., 5701 Natural Bridge Ave., St. Louis 20.*

Portable Dry Chemical Extinguisher

Four-page folder announces a portable dry chemical fire extinguisher that holds 350 lb. of compound which is discharged at 200 psi. by 2,000 psi. of dry nitrogen. Two men can wheel this unit whose entire contents can be expelled in 75 sec. if necessary.—*American-La-France-Foamite Corp., Elmira, N. Y.*

Sucrose Octa Acetate Data

Physical and chemical properties, latest specifications, and applications of sucrose octa acetate are contained in Bulletin 16. Although a derivative of cane sugar, it is for use as a "bitter" in foods.—*Union Carbide & Carbon Corp., Niacet Chemicals Div., 1035 Niagara Bldg., Niagara Falls, N. Y.*

Acid-, Alkali-Proof Floor

Specifications and applications of Nukem floors are outlined in 4-page Bulletin 3-F-11 (NN). They are stated to be acid, alkali, and leak proof and to be completely resistant to fruit acids, sugar syrups, and strong detergents. —*Nukem Products Corp., 111-119 Colgate Ave. Buffalo 20, N. Y.*

Miscellaneous

Packaged Meat Merchandising

The "Ten-X-One" Meat Loaf Merchandising Program, from processing through retailing, is described in 20-page brochure.—*Basic Food Materials, Inc., Vermilion, Ohio.*

Welding How-To

How to Weld With Heliarc Torches, 28 pages, contains information on welding, surfacing, and hard-facing. It gives complete descriptions of the entire welding process, together with properties of metals.—*The Linde Air Products Co., 30 E. 42 St., New York 17.*

Soft Ice Cream Machine

Attracting much attention at the recent dairy show was the Whirla-Whip "Homogenator", now presented in 6-page folder. It transforms regular ice cream into soft cream right at retailers' counters.—*Whirla-Whip, Inc., 1511 WOW Bldg., Omaha 2, Neb.*

Unfired Pressure Vessel Specs

Partial analysis of the 1950 ASME code for unfired pressure vessels is featured in 10-page bulletin. Pictured are typical examples of plate and heat exchanger fabrication.—*Downingtown Iron Works, 30 Church St., New York City.*

—End

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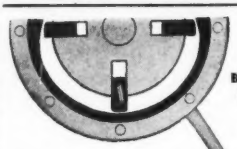

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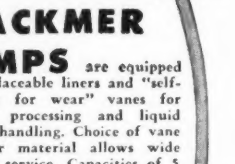

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Patents

Popcorn Coated With Mixture of Edible Vegetable and Animal Oils and Fats, Salt, and Flavoring Ingredient to Retard Change in Moisture Content During Storage—*T. D. Nairn, Dolton, Ill.* No. 2,518,247. Aug. 8, 1950.

Fruit Pitting Machines Equipped With Vacuum Cup Mounting—*Arnold Besag, East Malvern, Victoria, Australia.* No. 2,518,274. Aug. 8, 1950.

Sugar Solution Containing Turbidity-Imparting Adhesive Impurities Clarified by Action of Minute Gas Bubbles Forced Into Solution Well Below Surface to Give Agitation and to Form Surface Foam or Froth Containing the Impurities—*G. M. Eguchi and C. H. Wells, to Hawaiian Pineapple Co., Ltd., Honolulu, Hawaii.* No. 2,518,296. Aug. 8, 1950.

Butter Made in Churn Attachment to Centrifugal Cream Separators—*W. H. Harstick, Oak Park, Ill., to International Harvester Co.* No. 2,518,310. Aug. 8, 1950.

Turkeys, Fowl, and Like Packaged by Wrapping in Flexible Jacket Fitted With Cords to Secure Jacket in Close Contact with Contents—*H. B. Weber, Saginaw, Mich.* No. 2,518,406. Aug. 8, 1950.

Hot Water Extract of Roasted Ground Coffee Treated With Calcium Hydroxide and Calcium Oxide as Precipitant, Filtered, Treated With Mixture of Lactose and Gum-Arabic as Aroma Retainer, Adjusted to pH 4.7-5.4 by Addition of Tartaric or Citric Acid, Dehydrated, and Mixed With 0.4-0.8 Percent of Total Weight of Aromatic Oil Squeezed From Roasted Coffee Powder—*Johannes H. Schaeppi, Mitlodi, and Walter Mosimann, Glarus, Switzerland.* No. 2,518,441. Aug. 15, 1950.

Citric Acid Converted to Ester of Monoisopropyl Citrate and Mono-stearyl Citrate—*C. M. Gooding, Staten Island, N. Y., H. W. Vahlteich, Edgewater, and R. H. Neal, North Bergen, N. J., to The Best Foods, Inc., New York City.* No. 2,518,678. Aug. 15, 1950.

Stalk Vegetables Mechanically Grouped, Trimmed, and Filled Into Containers—*G. S. Coley, San Jose, and J. Sousa, Mountain View, Calif., to Schuckl & Co., Inc.* No. 2,518,757. Aug. 15, 1950.

Cured Meats Packaged in Multiple Ply Wrapper Comprising Combination of Exterior Protective Sheet, Moisture Retaining Cushion Sheet, Grease and Moisture Resistant Barrier Sheet, and Adhesive Applied in Discontinuous Areas to Permit Sealing of Wrapper With Provision For Ventilation Spaces and Limited Movement Between Sheets—*E. C. Draheim to Daniels Mfg. Co., Rhinelander, Wis.* No. 2,518,762. Aug. 15, 1950.

Glyceride Oils Made to Contain Small Amount of Hydroxy-aromatic Compound to Give Improved Cold Test Property—*K. F. Mattil to Swift & Co., Chicago.* No. 2,518,917. Aug. 15, 1950.

Lysine and Intermediates Produced Synthetically—*A. Galat, Yonkers, N. Y.* No. 2,519,038. Aug. 15, 1950.

Fruits and Vegetables Treated With Water Solution Containing 3-Hydroxybutanol to Maintain Fresh Appearance During Shipment—*H. S. Hateshi to Zenith Processing Corp., Los Angeles, Calif.* No. 2,519,465. Aug. 22, 1950.

Protein Recovered From Defatted Liquid Milk by Simultaneously Delivering Streams of Milk, Coagulant for Casein, and Noncondensible Inert Gas Into Mixing Zone Preliminary to Separating Dispersed Casein From Whey, Spraying With Wash Water, and Drying—*P. F. Sharp, Piedmont, California, to Golden State Co., Ltd., San Francisco.* No. 2,519,606. Aug. 22, 1950.

Chewing Gum Base Made to Consist of Natural Gum, Polyvinyl Acetate, and Polymer of $SC_2H_4OCH_2OC_2H_4S$ Composition and to Have Softening Point in Range of About 45-110 deg. C.—*B. N. Longovoy, Jackson Heights, N. Y., to American Chicle Co., Long Island City.* No. 2,519,775. Aug. 22, 1950.

Milk Chocolate Made by Mixing Cocoa, Fat, Sugar, and Spray-Dried Milk Having Average Grain Porosity Not Exceeding Approximately 10 Percent by Volume—*B. K. Hallqvist, Stockholm, and L. O. J. Campbell, Norrkoping, Sweden, to Svenska Mjolkprodukter Aktiebolag, Stockholm.* No. 2,519,833. Aug. 22, 1950.

Animal Carcasses and Meats Cuts Held for 3 to 5 hr. in Zone of Normal Animal Body Temperature to Accelerate Rigor Mortis Transition Period Without Causing Appreciable Color Changes—*H. L. Roschen, Maywood, and B. J. Ortscheid and J. M. Ramsbottom, Chicago, Ill., to Swift & Co., Chicago.* No. 2,519,931. Aug. 22,1950.

Frozen Foods Packaged in Containers Consisting of Resilient Plastic Material and Providing for Sheets of Ice, Which Upon Melting Distort Container From Its Rectangular Shape—*T. S. Gorton, Jr., Chicago, Ill.* No. 2,519,960. Aug. 22, 1950.

Gelatin Product Made to Have Improved Rate of Gelation in Acid Medium by Inclusion of Gel-Forming Material Containing Water-Soluble Sulphate Ion-Producing Composition of About 1 to 10 Percent Based on Dry Weight of Gelatin—*D. P. Grettie to Swift & Co., Chicago.* No. 2,519,961. Aug. 22, 1950.

Cheese Made by Holding Drained Cut Curd in Vessel Lined With Substantially Air-Impervious Wrapper With Overlapping Portions to Seal Against Ingress of Air While Permitting Its Escape and Holding Curd in Container Until Cheese Body Characteristics Develop—*C. Toone, Rochester, Ind., to Armour and Company, Chicago, Ill.* No. 2,520,183. Aug. 29, 1950.

Fresh Vegetables Immersed in Approximately One Percent Solution of Sodium Hydroxide for Approximately 1 min. at 65-70 deg. F. and Rinsing in Clear Water Preparatory to Freezing With Enhancement of Color—*J. R. Kenworthy, Jr., Modesto, Calif., to John Inglis Frozen Foods Co., Stockton, Calif.* No. 2,520,214. Aug. 29, 1950.

Semi-Liquid Confection Material Forced by Piston Action From Hopper Into Container and Container Simultaneously Closed by Action of Plunger Working in Synchronization With Piston—*H. W. Grau, Louis, Va.* No. 2,520,242. Aug. 29, 1950.

Comb Honey Freed of Capping Wax During Continuous Passage From Feed Hopper Along Heating Grid Over Open Pan Constructed to Receive Melted Wax Beneath the Grid and Honey at Discharge End of Grid—*W. T. Brand, Beemer, Nebr.* No. 2,520,304. Aug. 29,1950.

—End

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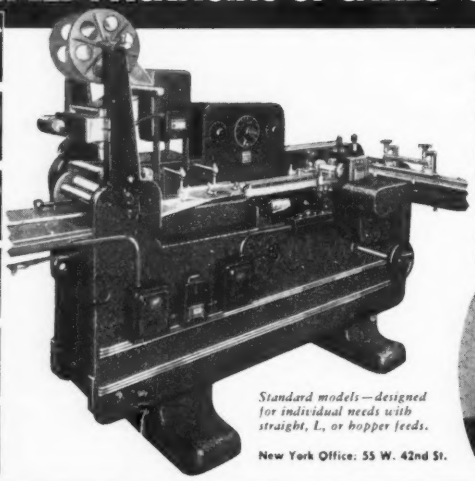

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Lighting Maintenance

—*Continued from page 98*

least one type of lamp-breaking equipment comes equipped with a device that produces a fine water spray to minimize escape of dust from the breaking process.

Accessories

Although the cleaning and relamping of a lighting system can be analyzed and scheduled, maintenance of accessories is somewhat more difficult to anticipate. A better understanding of some of the accessories, and the conditions under which their failure is likely, may help to minimize maintenance work.

Lampholders (or sockets) and switches are the main causes of emergency maintenance in incandescent lighting installations. Their failure most often develops from overheating due to overloads (the use of lamps, or groups of lamps, larger than those for which the devices were designed), or to poor contact between lamp and socket. Latter may result from a gradual unseating of the lamp by vibration, or from contact screws that have been loosened.

Accessories in fluorescent lighting fixtures, though designed for a relatively wide range of conditions, are subject to failure when subjected continuously to abnormal conditions not readily apparent to casual observers. The ballast (black brick-shaped device inside of fixture housing) is designed to act as an automatic valve to control flow of current to the lamp. When a lamp fails, this valve automatically attempts to restart it by permitting the passing of more current than is normally required for operation. If the dead lamp is not removed or replaced promptly, the higher starting current, flowing almost continuously, will cause severe overheating, not only of the ballast, but of the starter, starter socket, and lampholders as well. This results in the ultimate failure of one or more of these accessories. Use of a good brand of starter, equipped with a circuit breaking device (commonly known as a cut-out starter), will prevent most trouble here.

Sometimes a lamp appears to have failed because the contacts of a defective starter may be stuck in either the open or closed position. Evidence of this is either a constant glow at the ends of the lamp (closed starter contacts) or no glow or flicker at all (open starter contacts). Replacement of the starter will remedy this condition, unless, with the new starter in place, the intermittent glow in the lamp ends is of a reddish color. This indicates a failed lamp.

Overheated lampholders should be replaced if the lamp contact pins do not seat with a snap when the lamp is installed. Poor contact results in early lamp failure or poor lamp performance as well as possible failure of the accessory equipment. Abnormally high or low voltage can be the source of trouble because of adverse effect on the performance of lamps and accessories.

Despite these possibilities of trouble, however, there is little cause for alarm if lighting equipment of good design and good quality is operated under the correct conditions and is afforded reasonable care.

End (*Resume reading on page 99*)

Air Conveyors

—*Continued from page 80*)

processed feed are quickly unloaded with a 2 to 3 psi. pressure drop line. Installation pictured is a 5-in. line that handles 10 tons an hour.

It is a suction system, with a 60-hp. motor driving a positive displacement exhauster located on top of a three-story building, as seen in the

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Extra large steam jacket and fittings, plus larger draw-off, will speed operation, cut costs. (Draw-off sizes up to 4" and larger if necessary.) Investigate the Hamilton Stainless Steel Mix Cooker and Tilting Kettles today.

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second picture of the installation. Total length is 250 ft.

The pick-up end of the line (at worker's feet in the photo) is used in the car like a vacuum cleaner.

The longest line in the plant is a 5-incher that conveys ground starch from the grind building to the packing house. It is 400 ft. long. This is the highest pressure installation, using compressed air at 20 psi. from the plant system, and it is, of necessity, a pressure type.

Over 11 tons an hour of starch is handled in 489 cfm. of air. This comes to a little over 1 cu. ft. of air per pound of starch.

Photo shows the feed-in point of this line. A 20-hp. motor turns the screw-pump feeder.

The longest vertical line in the plant is the one used for conveying soybean meal after it's been carried by buggy cart from the extraction plant to the packing house (1½ mi. away). A 30-in. H_2O suction system shoots the soybean meal straight up six stories. Actually, vertical air conveying is easiest because material remains evenly distributed throughout the entire area of pipe. In a horizontal line, gravity tends to pull material to bottom.

Descriptions of all of the company's air conveyor installation would take pages, but here are the types of systems used for each material, including the ones discussed above:

The highest pressure type is used only for starch. Two to 3 psi. air systems convey soybean meal and cake, lime, wet bran and corn germs. The 20 to 30 in. H_2O types find application on spray-dried syrups and starches and soybean meal. And lowest-pressure lines carry corn gluten feed, corn gluten meal, corn oil meal, and also pick up around hammer mills.

End (Resume reading on page 81)

Prints Cases

—Continued from page 117

station, the cases continue to an L-shaped transfer point, where a rectangular metal plate positions them on another chain-flight conveyor. They now are carried to the second printing station, where the two end panels are printed. The machine has a variable-speed setting to alter the capacity of the unit. Maximum rate is 2,000 cases per hour.

Printing is accomplished by means of conventional deep-cut rubber-box dies mounted, as stated, on rotary die-wheels. The intensity of the impressions is precisely controlled by the die-wheels and case-holding mechanisms that permit kiss-contact between die and panel. A control mechanism compensates for any irregularities on the surface of the cases, thus assuring sharp, uniform, legends.

The printing system in the new machine is similar to that on aniline-printing presses. Constant recirculation of the ink permits the use of fast-drying inks and assures consistent impressions throughout the run.

Ink is first automatically applied to a supply roller, then is transferred by a knurled metering roller that deposits a measured film of the pigment to the die. By applying ink in this manner, over-printing is avoided.

The ink supply in the machine's reservoir may be replenished without interrupting the operation of the printer. The reservoir holds an 8-hr. supply of ink.

Dies cost about $20 per panel, or $80 for the four panels. Life expectancy of the dies is 750,000 to 1,000,000 impressions. This long life is attributed to kiss-contacting the panels rather than pressure-contacting them, as in the case when using plates.

End (Resume reading on page 80)

HERE'S YOUR ANSWER TO COOLING OR PASTEURIZING PROBLEMS

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UNITIZED BOLTED CONSTRUCTION
AUTOMATIC FEED & DISCHARGE

A time-saving, money-saving, specifically designed unit to pasteurize, hold and cool products packaged in jars, bottles and cans, and which are processed, due to their nature, in their final containers. Made in three widths—up to 72 ft. in length (multiples of 12"). Steel or stainless steel. Additional sections can be added at any future time.

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Dept. FI-2

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The Way to Foolproof Sanitation

—*Continued from page* 100

motors, gears, chain drives, and the like, shed their dirt into the production zones of machines? Are all surfaces of machines available for cleaning? What is the frequency of cleaning? Is each unit properly screened and rodent-proofed? Do you have quantities of material lying in corners, under stairs, or on top of equipment?

Changing the Habit Patterns

If you have had no organized sanitation program, you will probably conclude that such a program mostly concerns people. Perhaps you'll decide you have a plant full of workers with a lot of bad habits, and you may turn to your newly appointed sanitarian and say, "Mister, you are going to have to be the greatest diplomat that ever lived to get this situation straightened out."

The biggest single problem may well be that of changing undesirable habit patterns, acquired over the years when insufficient attention was paid to sanitation. By this time you may decide that your sanitarian should attend one of the short courses offered in the various fields of food plant sanitation. You may decide that you need a full time sanitarian, with special training, or that you need a professional sanitarian to assist you in developing and directing your program.

You and your sanitarian must also reach a decision concerning the use of chemicals, especially rodent poisons, insecticides, and germicides. These things are largely poisonous, and therefore, in themselves may contaminate your product if not used with care. Hence, you should think of solutions to the problem that are preventive in nature, and so do not require the use of poisons and chemicals.

You must control rodents by keeping them out—instead of "inviting them in" and killing them. You must control insects by destroying their breeding places, rather than by killing them in quantity every Saturday. You must control micro-organisms by frequent cleaning, instead of letting them grow and removing them with germicides. Micro-organisms are associated with a combination of food materials and moisture, so frequently elimination of the moisture is the remedy.

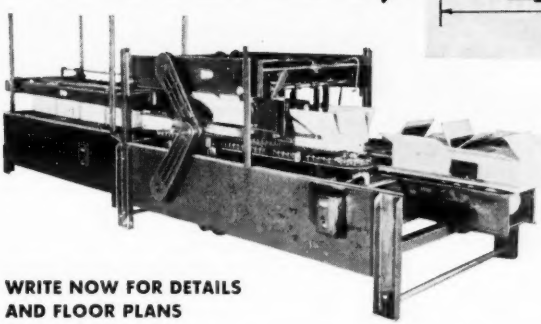
Now you have come to the end of your production process. And you may wonder how your product rates on the score of purity. There are laboratory tests for all types of products that can tell you much in this regard, and maybe you should pick a sample off the packaging machine and send it out for laboratory analysis.

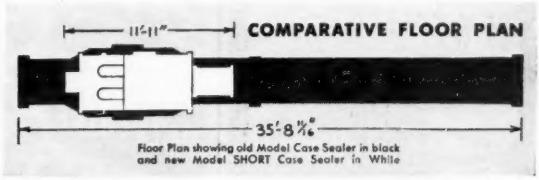
Back in the office, you and your sanitarian sit down and discuss the matter. You have decided that the right approach is prevention, and you see that it concerns everybody—that it is everybody's job. You may see that it involves a great many basic corrections of your current ways of doing things, and that changes in machinery and building repairs are required. You may conclude that certain steps will have to be taken immediately, but that the over-all program is going to have to be a long term, gradual process.

You will have to list, on paper, the various corrective steps that must be taken, from the time materials are purchased until they are prepared for shipment. You will have to call in supervisory personnel from various points along the line, and "sell" them on the changes that they will have to make in their department. You will indoctrinate them on the principles involved in the prevention of contamination. You will have the beginning of an organized sanitation program.

End (*Resume reading on page* 101)

NEED MORE ROOM?





Floor Plan showing old Model Case Sealer in black and new Model SHORT Case Sealer in White

Save Floor Space

WITH A-B-C SHORT CASE SEALER!

Save two-thirds of your valuable floor space with the A-B-C Short Case Sealer—with increased packaging efficiency, more speed, less expense . . . Automatically glues, folds and seals either or both top and bottom flaps of shipping cases in one operation. Made in eight models to fit any production requirement. Hot air heaters dry the glue in one-half the time. Speeds up to 30 cases per minute.

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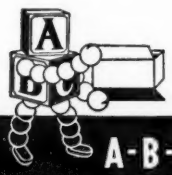

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UNITED STATES COLD STORAGE CORP.

5 MODERN FORTRESSES FOR GUARDING THE NATION'S FOODS

Clean Air

—*Continued from page 75*)

At the Haffenreffer Co. brewery in Boston, all air entering the plant's new fermenting room is filtered by passing through Precipitrons. Here, too, a slight static pressure (2 psi.) is maintained within the room. This is necessary to prevent leakage in through doors and ventilators. To remove the CO_2 given off during the fermentation process, filtered air (18,000 cfm.) is supplied to the room, and an air-CO_2 mixture is removed continuously by exhaust fans.

Further protection is provided for the open fermenters by two germicidal lamps mounted above each vat. There are 143 of the ray units in the fermenting room. They are not operated during working hours, but are turned on each night and run over week-ends.

In the three years since the new fermenting room was completed, no contamination of yeast occurred. Accordingly, all yeast removed from the fermenters has been suitable for starting new brews.

End (*Resume reading on page 76*)

Light Discolors Meat

—*Continued from page 124*)

or other means of attracting attention to the display case. There is need for a means of attractively displaying meats and still keeping the light intensity at a minimum.

The foregoing methods concern control of exposure to light. Since the discoloration is actually an oxidative reaction, the third method of control is the elimination of air. This method is in its commercial infancy, and much research on both packaging equipment and packaging material remains to be done. However, the experiments are designed to perfect means of vacuum and inert-gas packaging.

If processed meats are packaged under a 29-in. vacuum, the small amount of residual oxygen is rapidly used in biological processes and little or no discoloration occurs on exposure of the products to light. Likewise, nitrogen may be used to displace the air in a package and thereby prevent discoloration. Obviously, the success of these types of packages depends on the effective removal of oxygen, adequate sealing, and subsequent nonpermeability of the transparent package to oxygen.

The effectiveness of an oxygen-free package in preventing the discoloration of sliced, table-ready meats has

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When sending sample, be sure to State fineness desired.

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been demonstrated in controlled laboratory tests, as shown in the photo just mentioned.

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End (Resume reading on page 124)

Research Spells Results

—Continued from page 89

time and effort is devoted to making these planning meetings work effectively. Because of management participation, research knows that its work is of importance to the company and that its research successes are further on the way to immediate and valuable use. At the same time, management learns how research pays off.

At project meetings all problems in which research should participate are discussed by the various experts. Problems are then assigned to the Central Laboratories or the divisional research groups—whichever is best qualified to handle them. Following the meeting, detailed programs are drawn up in line with available manpower, budgets, and other factors. At the fall meeting, the projects and budgets come before management for approval.

GF's organized research does more than sustain the company's growth. It assures the future for 15,000 people who work in plants, offices, and laboratories. It also protects the investments of approximately 68,000 stockholders who provide the money for building a better and greater company, and it also perfects quicker and more efficient manufacturing processes.

For example, Sanka decaffeination—once a 96-hr. process—now takes only 8 hr. And the new Jell-O flavor process saves the company, in one year, many times the several years' research expense needed to perfect it.

End (Resume reading on page 90)

BHA Ups Shelf Life

—Continued from page 84

in this period were proportionally greater than increases in the total non-rancid period in every instance where the antioxidant was used in peanut products having abundant flavor acquired during processing.

The above feature is based on the

IT COSTS YOU LESS MONEY

PC Foamglas—the long life insulation

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The insulating effectiveness of Foamglas helps maintain low temperatures with fewer hours of compressor operation, thus saving money on electric current and postponing costly repairs to cooling equipment.

The cellular glass structure that makes Foamglas such an exceptionally effective insulation also makes it the long life insulation. Since glass is practically impervious to elements that destroy other materials, PC Foamglas—when properly installed—retains its original insulating effectiveness.

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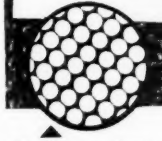
When next you figure on insulation, consider the money-saving advantages of Foamglas on a cost-per-year basis. If you are facing special insulating problems, our specialists will be glad to consult with you.

Meanwhile, you will find a lot of helpful information in our current literature. Just send in the convenient coupon and your selection of our booklets will be forwarded promptly, with a sample of PC Foamglas.

Here, PC Foamglas is shown in core wall construction—laid up between inner and outer masonry walls—at the new hog processing plant of Standler Packing Company, Inc., Columbus, Ind. Strong, rigid Foamglas blocks insure a long lasting barrier to vapor and heat transfer . . . help maintain required operating temperatures of minus 5°F. to 38°F. in this building. Architect: Johnson and McKenney, Columbus, Ind.



This diagram shows how a group of glass bubbles which contain still air, can form a continuous, cellular material. The black area is glass, the white space is air. PC Foamglas, the cellular glass insulating material, consists of glass and still air, both excellent barriers to heat travel. And, being glass, Foamglas has unusually high resistance to moisture, vapor, fumes and acid atmospheres, is noncombustible, odorless, and verminproof. In this cellular glass construction lies the secret of the long lasting insulation value of PC Foamglas.

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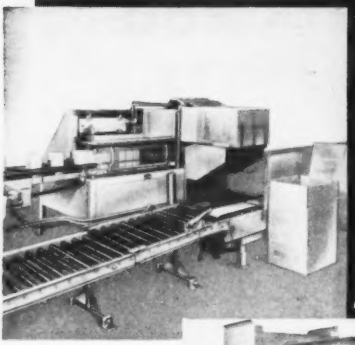
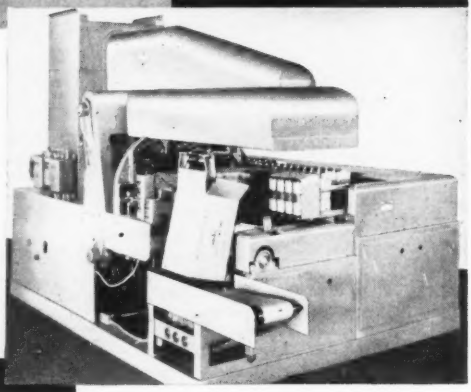
Now by PACKOMATIC

Paper Shipping Cases Opened, Filled and Sealed . . . Automatically

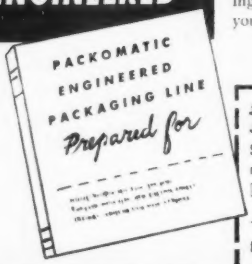




PACKOMATIC automatic shipping case loader with gluer-sealer, (*above*), takes round or rectangular packages, assembles and loads them into previously squared and registered end-opening shipping cases.

PACKOMATIC fully-automatic shipping case opener-loader, (*right*), forms containers and positions them for receiving assembled packages, then discharges cases, ready for gluer-sealer.

COMPLETELY AUTOMATIC PACKAGING production line to loading dock PACKOMATIC ENGINEERED



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paper, "Shelf Life of Salted Peanuts, Salted Pecans, Peanut Butter, and Cooking Oils Increased by Use of Butylated Hydroxyanisole As an Antioxidant," which was authorized for publication as Technical Paper No. 206, Journal Series of the Georgia Agricultural Experiment Station. Research project was sponsored by the Tennessee Eastman Corp. and the Georgia Agricultural Experiment Station. Sara Siewert directed taste panel.

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End (Resume reading on page 84)

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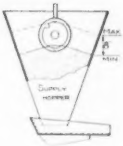

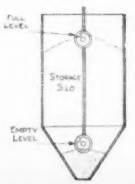

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(Continued on the opposite page)

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(Continued from opposite page)

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6—Pony Labelrite, 86 ML, 86 MLVA, 86 MX4.

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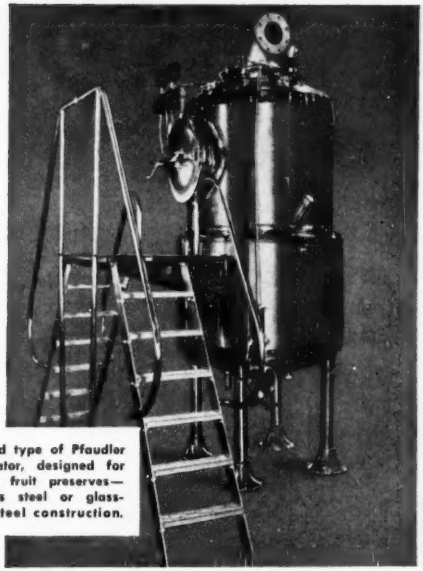
Are you boiling away the SALES APPEAL of YOUR PRODUCT?



Jacketed type of Pfaudler Evaporator, designed for making fruit preserves—stainless steel or glass-lined steel construction.

Vertical tube type Pfaudler Evaporator for concentrating large volumes of juices, syrups, milk, etc.

Open kettle boiling of fruits and juices sure can wreck their sales appeal in a hurry. It ruins all natural characteristics. It may even cost you more to process. Most important, it makes it tough to sell the final product. So why do it the hard way?

Besides processing at a lower boiling point, Pfaudler Vacuum Process Equipment enables you to accurately control the operation from start to finish. This uniform control helps you to stabilize natural flavor, color and bulk of fruit products; it helps you maintain the natural color and taste of juices, jellies, jams, syrups and flavorings. You eliminate carmelization. Most important, you enhance sales appeal by controlling all aspects of the processing cycle.

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Whether your process requires a jacketed vacuum cooker or large vertical tube heat exchanger evaporators, Pfaudler has the know-how to completely engineer your plant. It assumes the responsibility for achieving desired results. Let us help you with your problems. Use coupon below.

Pfaudler Vacuum Process Equipment Preserves the Sales Appeal of Your Product

Pfaudler

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One smooth package gives you automatic refrigeration *plus* all the Metro body and International Truck chassis advantages that have made Metros the outstanding truck for multi-stop deliveries for so many years.

Dependable temperatures as low as 10 degrees above zero are *automatically* maintained by the new IH Motor Truck refrigeration units in the well-insulated Metro bodies. With this protective refrigeration, you can offer better service, lengthen routes, increase the volume of your business.

And you get all this as a bonus!

(1) New Metro Bodies! Payload capacities are larger for peakload deliveries and longer routes. They have lower floor height for easier loading and unloading.

(2) Choice of two body capacities—two refrigeration units! You get the 12-foot Metro body with either 256.4 or 272.5 cubic foot capacity. The refrigeration unit is available with either gasoline engine drive, or with combination gasoline-electric drive.

(3) New Heavy-Duty Engineered International Chassis! This extra-value engineering pays off in lower operating costs, lower maintenance costs, longer truck life. You get the same heavy-duty engineered values that have kept Internationals first in heavy-duty truck sales for 18 straight years.

For all the facts about the new refrigerated Metros, call or visit your nearest International Truck Dealer or Branch.

*Metro. Registered trade mark of The Metropolitan Body Company, Inc., subsidiary of the International Harvester Company.

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TO MAKE IT HANDY

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WHAT THE NUMBERS MEAN

Editorial Items. Numbers on postcard correspond with those in the index below.

Advertisements: There is a page number on the postcard for each advertisement. Before the number may appear, L, R, T, B (left, right, top, bottom) locating the ad on the page; small letters following (a, b, c) indicate additional products in the advertisement.

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B_1, thiamine mononitrate. 64b
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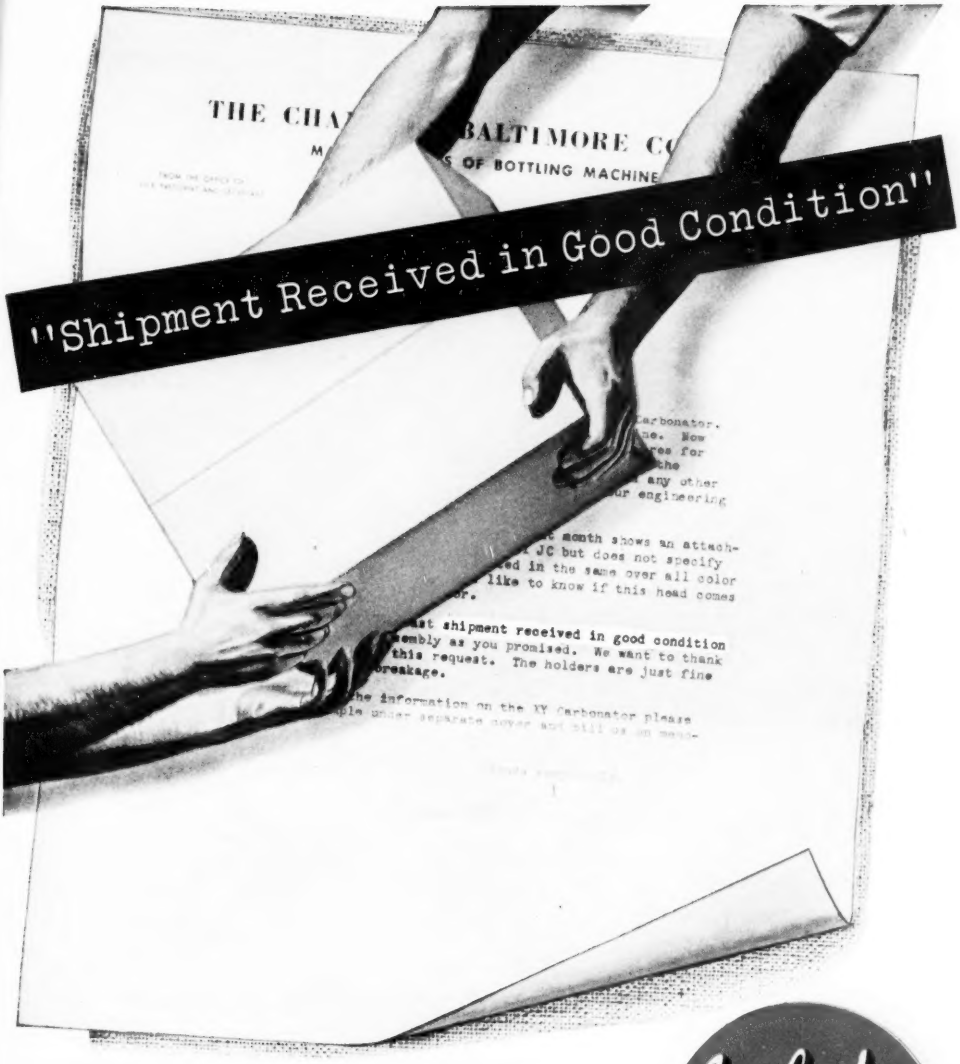

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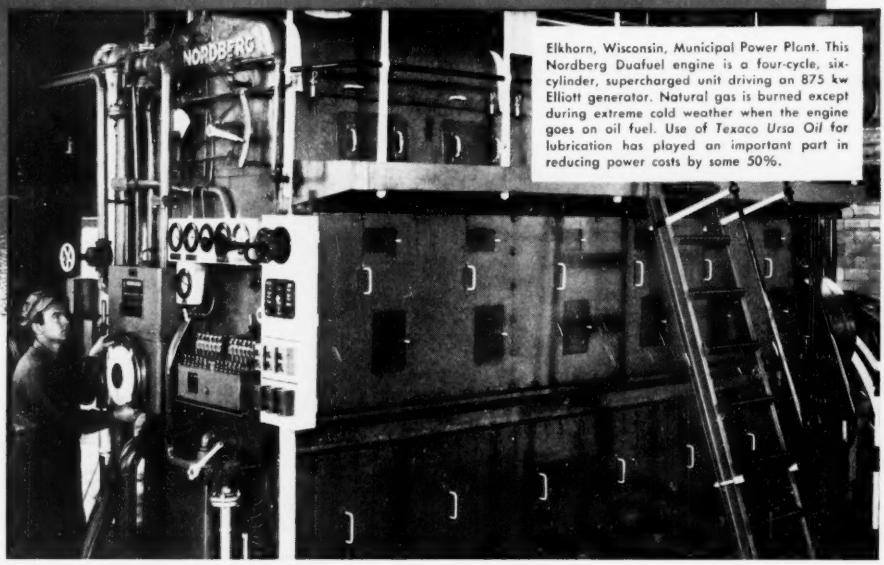

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